Chemical Week

October 13, 1951 Price 35 cents

Ryan and Greenewalt: Again, eager-beaver bureaucrats get set to wield "big stick" ..... p. 13

It's the only one of its kind: a solid, all-glycol nonionic detergent ..... p. 15

CW Camera follows plastics molder-on-wheels, sees "show-how" pay off ..... p. 16

"Big" molecules for big jobs: new amines graduate from pilot plant ..... p. 25

Gypsum moves in as ammonium sulfate raw material; bonus: sulfuric saving ..... p. 33

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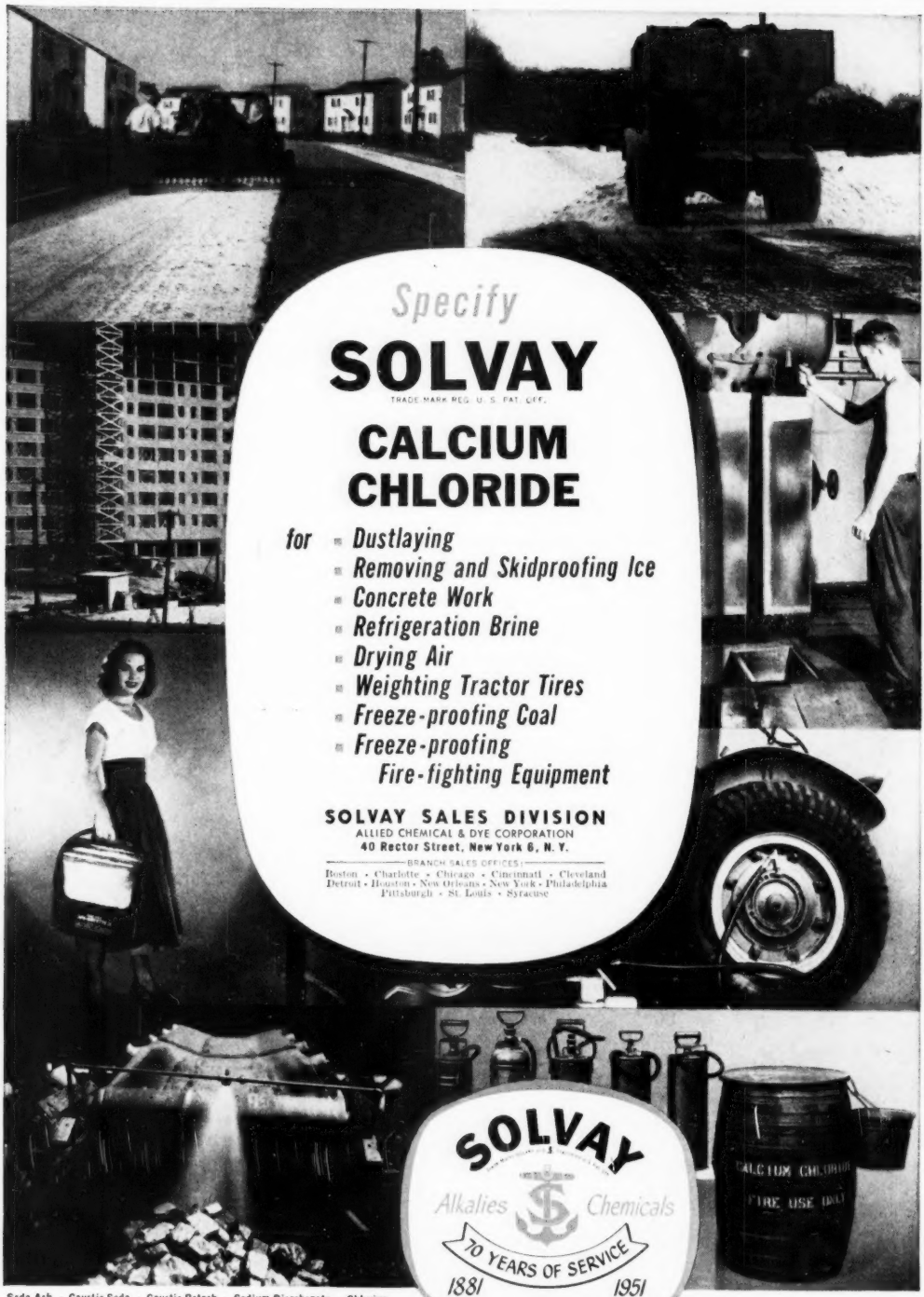
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Chemical Week

Volume 69 Number 15
October 13, 1951

OPINION	2
NEWSLETTER	7
BUSINESS & INDUSTRY	13
RESEARCH	25
PRODUCTION	33
SPECIALTIES	39
BOOKS	42
MEETINGS	42
MARKETS	45
BOOKLETS	52

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OPINION . . . . .

Royalty Waiver

To The Editor: Our compliments on your excellent article "Napalm Goes Automatic" (Sept. 22).

Ferro Chemical Corp., by its improved production techniques, has made a great contribution toward lowering the cost of napalm to the Armed Forces.

Another important contributing factor has been the action on the part of our company . . . the developers and holders of the patent on napalm . . . in granting to Ferro and other producers a license to manufacture the material, without royalty, for military incendiary procurement.

This royalty-free arrangement was voluntarily entered into by the company with the Government after the greatly increased need for napalm became apparent in Korea.

We think your readers would be interested in this evidence of cooperation within industry for the defense effort.

Arthur Minich
Executive Vice-President
Nuodex Products Co., Inc.
Elizabeth, N. J.

Zero on Zero

To The Editor: In your Sept. 8th issue a letter from one of your readers under "Numbers Game" in the Opinion column derives a mathematical defense for pseudo-equality, 10–1 = 8. Although, as you noted, this defense was not needed in the case for which it was originally submitted, it would not be advisable to use in any circumstance either of the three proofs that 8 = 9 for the following reasons:
First Proof: The hypothesis was a = b+c with a being the larger and b being the smaller number with c, the difference. As c approaches 0 the limit of a is b. However, when c is a positive finite number (such as 3) a—b—c=0 by the original hypothesis. The last step wherein a = b is derived is a division of the equality a2—ab—ac = ab—b2—bc by a—b—c, but the latter term, as we have shown, equals 0. By factoring the two dividends in the equality before division one obtains a (a—b—c) = b (a—b—c). Hence, we have zeroes in each numerator—

$$\frac{0}{0}$$

indeteriminate and therefore, a does not equal b.
Second Proof: It does not have to be assumed that a = b in writing the equation (x—a)3 = (x—b)3. In order that the equality be true a must equal b irregardless of the fact that the equation has a real route, x = ½ (a + b). Therefore, if a = 8 then b = 8, not 9.
Third Proof: In the equation

$$5+\frac{9x-60}{8-x}-\frac{4x-20}{9-x}=0,$$

x can only equal + 5. Therefore as your defender states, it is no fanciful equation. Reducing the equation as in the proof to

$$\frac{4x-20}{8-x}=\frac{4x-20}{9-x},$$

The equation (at first glance) would appear to prove that 8 = 9. However, substituting 5 for x, the right and left numerators are shown to equal zero. Zero divided by any number other than zero equals zero, and therefore, 8 does not equal 9, and the two denominators equal respectively 3 and 4.

J. F. Dockum, Jr.
Purchasing Department
E. I. du Pont de Nemours & Co., Inc.
Wilmington, Del.

Algebra-groggy CW *thanks Reader Dockum, hereby cries "Uncle" to further "proofs" and disproofs of mathematical chicanery.*—Ed.

Head in the Sand

To The Editor: . . . In your Sept. 1 issue you have an article, "Another Round," concerning bread.

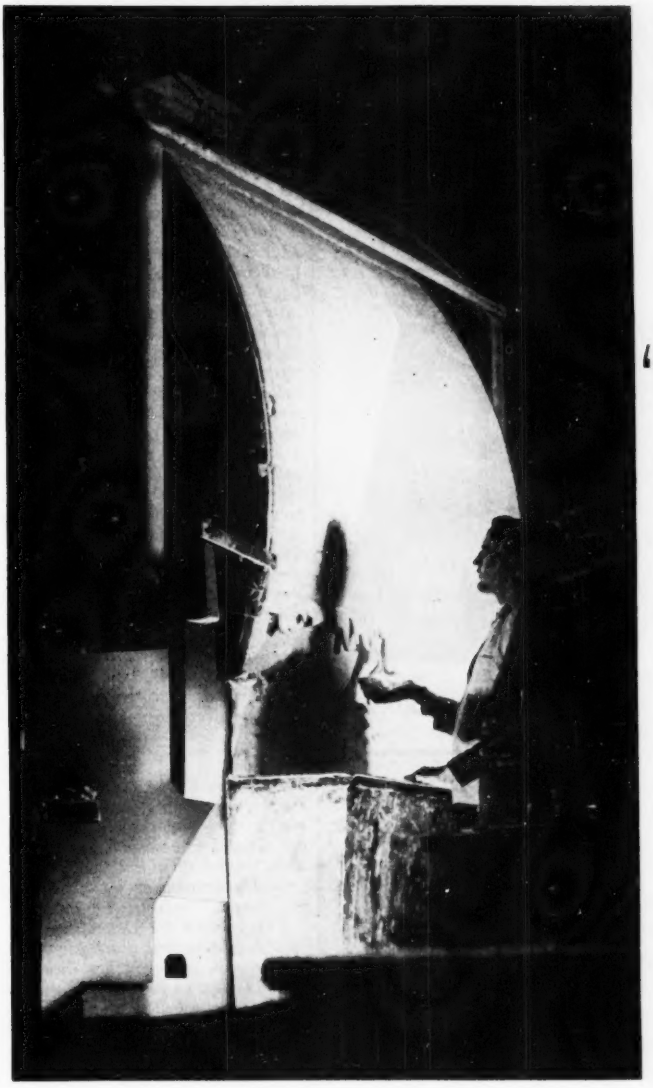
I do not necessarily subscribe to the ideas . . . in your reference to the Senate Agriculture Subcommittee but let's not kid ourselves that the public is not looking askance at present practice in bread production.

Unless the public is thoroughly reassured, the present trend will continue. Doctors—and the type of people who border on the activities of doctors such as naturopaths, chiropractors, dietitians, etc.,—are sounding an increasing alarm concerning the practices in production of bread.

If you want an index of such effects, investigate those places in which the customer is given full choice as to the type of bread he will be served . . . e. g. restaurants and sandwich counters . . .

. . . you will find an increasing tendency for people to request . . . the bread which in their mind is most nearly representative of the original grain.

I would wager that your data on the decrease in bread consumption does not take into account the amount of grain—whole or nearly



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OPINION . . . . . .

whole—which goes into the making of health food breads and specialty type breads—not sold through standard bakeries.

You say richer people eat less bread. . . . They are more ready to pay for special sources of bread—especially if their doctors recommend it. . . .

As soon as people who can think a little see labels that indicate an addition of three or four materials to their bread (niacin, B_1 etc.) they begin to find out that some 10-20 materials were reduced in the grain in the milling process (wheat germ oil, vitamins, minerals, etc.) . . . they resent having to buy them back in separate containers—each costing more than the loaf of bread from which they were originally taken.

It is time the chemical industries realized that such thinking is going on and started seriously finding out how to cheaply leave these materials in the bread grain instead of better ways to make bread soft for ten days or more. . . .

As I said before, I do not necessarily subscribe personally to the ideas I mention but ignorance of them or ignoring of them constitutes a "head in sand" type of activity which will lead to the type of controls you decry so vehemently.

HENRY D. FRAZIER
Tucson, Arizona

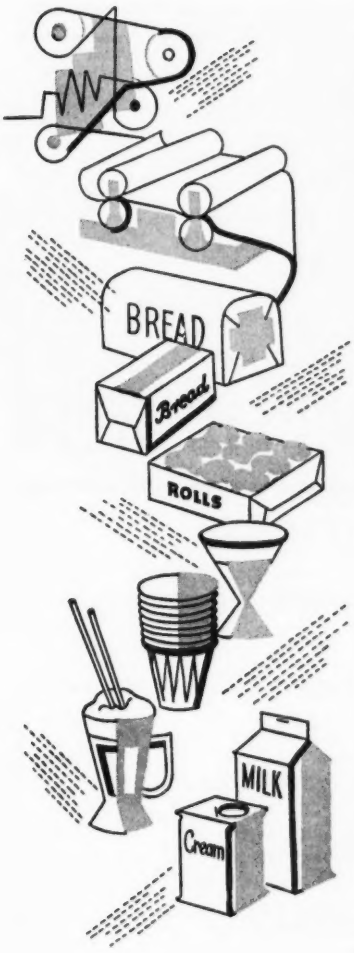
CW holds no brief for a number of the malpractices of the milling industry, and, in that respect, Reader Frazier, our views are reasonably compatible. However, we do object to a Committee's side-stepping an issue, damning the chemical industry by inference.

This is what the Committee said: In the past twenty years per capita consumption of bread has dwindled from 173 lbs. to 140 lbs. "That there are those who believe the decline in consumption is due to the fact . . . that present-day bread contains less fats . . . that chemicals and compounds . . . are widely used to impart softness and sales appeal."

Neatly overlooked as a just-as-logical reason for the decline in bread consumption: the economic facts of life which establish that as real income increases people spend more on meats, etc., less for bread.—ED.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: The Editor, Chemical Week, 330 W. 42nd St., New York 18, N. Y.



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DIPHENYLACETIC ACID, with two phenyl groups attached to the same carbon, should interest those involved with chemical synthesis. At present this aralkyl acid is a source for the diphenylacetyl radical in the preparation of pharmaceuticals, and an intermediate for an alternate synthesis of morphine substitutes. In the future, its broad potential as an intermediate will undoubtedly be more fully exploited.

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melting point: • 146°—148°C. (meniscus to complete melt)
appearance: • White powder

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$(C_6H_5)_2CHCOOH + RCH_2Cl \xrightarrow{Na} (C_6H_5)_2CHCOOCH_2R + HCl$

Alkyl chloride — Alkyl diphenylacetate

HYDROGENATION

$(C_6H_5)_2CHCOOH + 6H_2 \xrightarrow{Catalyst} (C_6H_{11})_2CHCOOH$

Dicyclohexylacetic acid

BROMINATION

$(C_6H_5)_2CHCOOH + Br_2 \longrightarrow (C_6H_5)_2CBrCOOH + HBr$

α-bromo-diphenylacetic acid

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NEWSLETTER

Bread standards—a vital issue to manufacturers of chemical ingredients—have been shrouded for months in a Washington fog.

Now, latest report is that a major chemical firm has asked for immediate adoption of the tentative standards, but that final action on emulsifiers prohibited therein be withheld for two years. Additional research, thinks the company, will vindicate its materials, prove their long-term safety.

Such a move would assure time enough to prove the case, and it would take Federal Security head Oscar Ewing (FDA's bosses' boss) "off the hook" with certain Congressmen. There's even a rumor that Ewing asked the company to make the move to escape criticism for inaction.

The other viewpoint: Bread standards have been in the works for 12 years, another 2 or 3 won't make any difference. Besides, the public isn't wrought up about the issue.

Another fog-shrouded subject is Ferdinand Eberstadt's proposed coal hydrogenation project. The Eberstadt-backed Colchem Corp. has already caused a rift within the lute (see p. 14); assertions and denials have been issued seemingly every hour on the hour.

Nevertheless, Colchem has taken option on 38,000 acres of coal land in Southern Illinois, plans to emphasize chemicals rather than liquid fuel in its planned 15,000-30,000 barrels-a-day plant.

Cosmetics, too, are coming in for Washington's beady-eyed scrutiny. Congressman Delaney, chairman of the House's food chemicals committee, is now urging creation of a special committee to look into cosmetics.

The trigger: FDA's recent seizures of shampoos and hair preparations containing synthetic detergents and germicides (see p. 40).

Safety is also a concern of water works engineers and municipal authorities—particularly in Chicago—who view with misgivings the fast-growing use of radioactive materials.

Special problems: lingering radioactivity of contained salts in water used to cool nuclear reactors, disposal of wastes.

Chicago has just created the first municipal advisory committee. has given it authority to recommend controls over users.

Exceptions to DPA's moratorium on certificates of necessity prove that chemicals rate high on the list of defense essentials:

Sodium chlorate (Oldbury), sulfur (Sinclair, Mathieson, Shamrock, Phillips), chlorbenzene (Columbia-Southern), petroleum hydrocarbons (Shamrock, Food Machinery), Epon resins (Shell), styrene monomer (Monsanto), and oxygen (Whitmore Oxygen) are among products getting fast write-off.

No money amount is given in most of the certificates. Reason: DPA rushed to get them out before September 23 so that plants could be covered under the Internal Revenue law. The actual amounts can be settled later.

DPA issued 111 certificates after the moratorium; but at the same time it turned down 350 for a plant value of a half billion dollars.

NEWSLETTER

Look for far-reaching side-effects of the Atomic Energy Commission's huge expansion program. Planned expansion of chemical and other industries will have to be reassessed in the light of AEC's increasingly larger grabs of construction materials and process equipment.

AEC is currently spending $1 billion a year on construction alone. This will be stepped up to the point where it preempts 500,000 tons of finished steel per quarter—and 20 million pounds of copper and aluminum. Congressional approval of AEC's $5-$6 billion request will almost certainly be granted.

Even now—before AEC has approval for its proposal—the chemical industry is having a hard time getting steel. Outlook for the first quarter of 1952 is no better than during the current period.

Plants now being built won't be stopped; but NPA will undoubtedly follow this priority scheme: First, plants already over 49% complete; next, plants over 19% complete and requiring only 100 additional tons of steel; then plants from 1% to 19% complete—the higher the percentage, the higher the priority.

Two reshuffles in Washington will make life easier for the chemical businessman who sells to the Government:

The Chemical Corps has reorganized its procurement, allocating specific responsibilities to each regional office. Details next week.

The Central Military Procurement Office has been moved back to the Pentagon. Businessmen had to go there anyway, preferred to have their dealings with the military all under one roof.

Development of a fast blue acetate dyestuff by Tennessee Eastman Corp. rounds out a complete series of acetate dyes resistant to light- and gas-fading.

The series, to be formally introduced to the trade later this month, includes red, blue, violet and three yellows; thus permits formulation of a wide range of colors.

Wax maker S. C. Johnson & Son is quietly increasing market areas for its new product, Hard Gloss Glo Coat, which first popped up in Canada (CW, July 28). It is now being sold in New York City and upstate New York, but it isn't on a national basis yet.

The product is not called a wax, and industry is betting that it's a high-shellac product designed to meet stiff competition from similar products in certain markets.

Heyden wants to sell and Mathieson is reportedly thinking of buying. That's the up-to-the-minute status of Heyden's $5 million interest in American Potash & Chemical Co.

Heyden is already raising $5 million by a stock issue, and the sale of its American Potash holdings would give it a comfortable nest egg for its expansion program. Possibility: a $12 million methanol plant.

"Chemical" roads are in the news again. A three-block stretch in Detroit is being laid with rubberized asphalt—one block with natural, one with synthetic, and the third with a mixture of the rubbers.

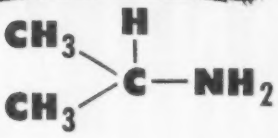
And in Wisconsin, Falls Paper & Power Co. is disposing of its sulfite liquor by spreading it on gravel roads in Oconto County.

. . . The Editors

DOUBLE CHECKED

FROM RESEARCH TO INDUSTRY

SHARPLES Isopropylamine



Isopropylamine undergoes all the reactions typical of primary aliphatic amines.

It can be supplied in anhydrous form without the use of pressure containers.

It can be used for the synthesis of many products including:

Pharmaceuticals
Agricultural Chemicals
Insecticides
Rubber Chemicals
Textile Assistants
Dyestuffs
Photographic Chemicals

SPECIFICATIONS

Color	Water White
Specific Gravity @ 20/20°C.	0.68-0.70
Amine content as Isopropylamine	98% (min.)
Distillation: 95% between	30.5-34.5°C.

OTHER PROPERTIES

Molecular Wt. (Calcd)	59.11
Flash Point (open cup)	–35°F.
Refractive Index 15.4/D	1.377

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Despite current shortages of this material, Dow is extremely interested in helping you utilize aniline to best advantage in your manufacturing processes. Dow will gladly cooperate with you if you desire technical assistance or further information about the economical use of aniline. Write to Dow, using the coupon at right.

HANDLING

Aniline is commonly stored in plain steel tanks. These tanks should be vented to a safe place. Although there is no particular fire hazard involved, it is advised that vents should be equipped with flame arrestors. It is also good practice to ground all equipment in which aniline is used.

If possible, it is advisable to use aniline in closed equipment only. When this is not possible, suitable ventilating equipment must be installed. A down-draft exhaust is indicated since aniline vapors are heavier than air.

Properties and Specifications of Aniline

Aniline is a practically colorless, highly refractive, oily, poisonous liquid with a characteristic odor. It tends to darken on exposure to air or sunlight but remarkably little color change occurs if aniline is stored properly.

Freezing Point, °F.	21
Boiling Point, °F.	364
Flash Point, Open Cup, °F.	158
Specific Gravity (77°F./77°F.)	1.021
Solubility (g/100 g.solvent)	
Water (25°C)	3.5
Alcohol	∞
Ether	∞

SPECIFICATIONS

Boiling Range at 760 mm Hg	
IBP-DP, within	1.5°C.
5-95%, within	0.2-0.7°C.
Freezing Point, minimum	—6.3°C.
Nitrobenzene	None
Color	Colorless to straw

This is one of a series of Dow advertisements you may wish to keep on file for reference and information. Write Dow for reprints.

PROTECTIVE EQUIPMENT

Aniline is so readily absorbed that adequate protective equipment should be worn whenever contact is possible. This equipment should consist of a minimum of safety goggles, rubber gloves and apron, rubber shoes or boots and coveralls and underwear.

Whenever an aniline tank is to be entered it should be washed completely free of aniline and fumes. Anyone entering the tank should be provided with a proper harness and life line in addition to the previously mentioned equipment. Another individual should be watching the person in the tank from the outside at all times.

Any individual upon entering aniline equipment should be equipped with approved breathing equipment. This may consist of a positive pressure hose mask with hose inlet in a vapor free atmosphere or a self-contained breathing apparatus with stored oxygen or air. All masks and breathing apparatus should be approved by the U. S. Bureau of Mines and should be equipped with full face masks.

The precautions taken in unloading tank cars or other containers of any poisonous, flammable liquid should apply to the unloading of aniline.

TOXICITY INFORMATION

Aniline is highly toxic but it may be handled safely if proper care is taken. It is readily absorbed by the body upon contact, inhalation or ingestion. The first symptom of absorption of toxic quantities is cyanosis or blue lips. A feeling of "drunkenness" may exist for a short time followed by headache, drowsiness, nausea and vomiting. This may be followed by unconsciousness and death if exposure continues.

Toxic effects of aniline are generally acute; however, repeated exposure to low concentrations may give rise to what is called chronic aniline poisoning. However, upon complete cessation of exposure, individuals generally regain their normal health with no permanent pathology being in evidence.

FIRST AID

In the event of aniline contact, all contaminated clothing should be removed immediately and the person should be washed with large amounts of soap and warm water. All clothing should be thoroughly decontaminated before further use. In case of eye contamination, the eyes should be washed for at least 15 minutes with large amounts of flowing water. A physician should be summoned as soon as possible.

If aniline is ingested, the victim should be given immediately an emetic such as mustard and water or lukewarm soapy water. In any case mentioned previously or poisoning by inhalation, the patient should be removed from any further exposure . . . kept warm and be transported to the nearest medical attention.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

WRITE DOW FOR INFORMATION AND TECHNICAL ASSISTANCE.

The Dow Chemical Company, Dept. OC-30,
Midland, Michigan

☐ **Please send me additional information about aniline.**
☐ **Please send_____reprints of this advertisement.**

Name_____ Title_____

Company_____

Address_____

City_____ State_____

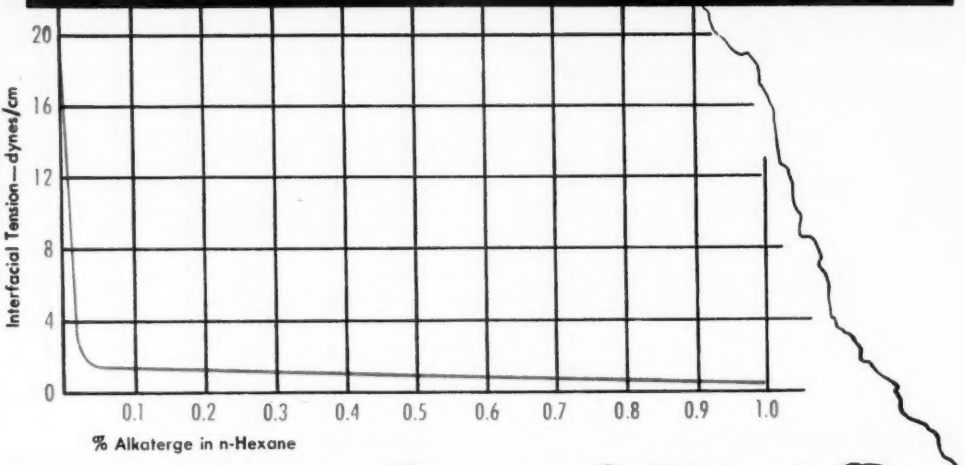
DOW

CHEMICALS

INDISPENSABLE TO INDUSTRY AND AGRICULTURE

ALKATERGE-C

oil-soluble wetting agent



Just 1/25 of 1% of Alkaterge-C—that's all it takes to reduce the interfacial tension between n-hexane and water to one dyne per centimeter. In mineral oil, 0.1% reduces the interfacial tension to approximately one to two dynes per centimeter. That's why Alkaterge-C is such a successful oil-soluble wetting and auxiliary emulsifying agent. It's a sort of chemical lever—makes it easy for the emulsifying agent to do its job. This striking effect on interfacial tension suggests many applications in connection with lubrication, extraction, and impregnating operations.

This non-volatile, amine-type compound reacts with acids to form salts and soaps which are themselves emulsifying and wetting agents. Salts of the mineral and lower aliphatic acids are water-soluble. With the higher fatty acids, Alkaterge-C forms oil-soluble soaps. These salts and soaps have been used as wetting agents and penetrants in metal cleaners and in the processing and impregnating of textile and paper products.

Alkaterge-C also has many uses based on its acid-accepting and surface-active properties. It is an effective anti-foam agent, especially when used in conjunction with mineral oil, and it is also an excellent pigment-grinding assistant in mineral oil vehicles.

We will gladly furnish you with a sample and additional data upon request on your company letterhead.

PROPERTIES (of commercial-grade material)

Molecular and Equivalent Weights	350, approx.
Coefficient of Cubical Expansion (20° to 30°C)	0.0008 per 1°C 0.0004 per 1°F
Distillation Range at 3 mm of Mercury	194°C to 310°C
Solidification Point	—36°C, approx.
Surface Tension of Saturated Aqueous Solution:	Less than 40 dynes/cm
Interfacial Tension against Water of a 0.1% Solution in Mineral Oil	1 to 2 dynes/cm
Flash Point, Cleveland Open Cup	430°F
Solubility	
in Water	Less than 0.002% by weight
in Mineral and Vegetable Oils	Miscible
in Organic Solvents	Miscible with naphtha, benzene, kerosene, carbon tetrachloride, ethyl acetate, acetone, methanol, butanol, and most other organic solvents.

SPECIFICATIONS (tentative)

Oxazoline Content	70% by weight, minimum
Specific Gravity, 25°/25°C	0.925—0.931
Nitrogen (Kjeldahl)	3.80—4.10% by weight
Color, Gardner Scale	15 maximum
Appearance	Clear, free from suspended matter

INDUSTRIAL CHEMICAL DIVISION

COMMERCIAL SOLVENTS CORPORATION • 17 EAST 42nd STREET, NEW YORK 17, N. Y.

PRODUCTS: Ethyl Alcohol & Derivatives • Acetone • Butanol & Derivatives • Formaldehyde
Methanol • Amines • Nitroparaffins • Crystalline Riboflavin

CSC

October 13, 1951 • Volume 69 • Number 15

Chemical Week

BUSINESS & INDUSTRY . . . . .

Old Charge, New Threat

Du Pont, ICI, Remington Arms and three corporate officers found guilty of violation of Sherman Anti-trust Act.

Decree to force Du Pont to spread technical "know-how" will be presented by government prosecutor within next few weeks.

Anti-trust attorney Emmerglick tells CW that company may be forced to open plants, patents to eyes and ears of industry.

Surprise and apprehension gripped the chemical world this week as it read and re-read the opinion of Federal Judge Sylvester J. Ryan (Southern District of N.Y.) in the government's case against the Du Pont Company, three other chemical corporations and five individuals, all of the latter being officers or ex-officers of the defendant companies.

Specifically, hizzoner found that Du Pont, Imperial Chemical Industries, Ltd., Imperial Chemical Industries (New York), Ltd., Remington Arms Company Inc. and Lammot du Pont, Walter S. Carpenter, Jr. (of Du Pont) and Charles K. Davis (of Remington) guilty of "conspiracy of restraint of trade and commerce in chemical products, sporting arms and ammunition, among the several states of the United States and with foreign nations etc. etc." In brief, Judge Ryan found the defendants guilty of violating that omni-present speed limit of American industry, the Sherman Anti-trust Act.

Point Three: Most chemical management attention, however, was directed toward the third conclusion in Judge Ryan's opinion as expressed in the terse sentence: "Plaintiff is entitled to relief by appropriate decree of this court." The proposed decrees will have to be filed within thirty days of the opinion dated September 28th.

The big question that hangs over the whole situation is whether these proposals for "relief" of the situation will be remedial or punitive in nature and purpose. And much of the answer will depend upon the thinking and inclination of Special U. S. Assistant Attorney General Leonard Emmerglick who led the government forces' charge upon chemical redoubts.

Emmerglick is currently preparing a proposed decree that will ask for a (1) compulsory licensing of Du Pont patents, (2) compulsory transfer of technical information and "know-how" and (3) separation of joint ownerships by ICI-Du Pont and ICI-Remington of other companies.

Change of Heart: The original government complaint, when filed in 1944, asked that patents be made available on a royalty-free basis. But there has been a noticeable change of government thinking in the meantime on this point. Now it seems more likely that some patents will be licensed on a royalty basis. The government people reason that having to pay for a patent will make it more attractive for business men to use it. And broader use of the patents, says the government, is its main goal in the whole affair.

Study On: In an exclusive interview with CHEMICAL WEEK, Emmerglick revealed that the government is making a careful study of 900 Du Pont and 2000 ICI patents which are listed as being part of the agreements under fire by the Attorney General. He added: "the government is not prepared to say at this time what terms it will ask for licensing."

But the most unique part of the government's proposal will be the unworldly, and wieldy terms it will lay down to enforce a spread of Du Pont's technical "know-how." Emmerglick revealed that the decree will specify that competitors be allowed to visit Du Pont's plants to see for themselves how processes work. The decree will also demand that Du Pont write informative manuals and run personal meeting with executives of other companies to promote the dissemination of Du Pont technical information.

Highlight of Something: All in all it seems that the executive and judicial arms of the federal government are madly swinging in the breeze again. Veterans in the chemical industry seriously question the practicality of any "enforcement" of know-how exchange. They ask bluntly: "How do you know when know-how is transmitted?" And the prospect of government experts making decisions on which know-how must be transmitted is at the same time a silly and terrifying one.

EMMERGLICK: Wants to sow seeds of "know-how."

But the real shocker in the whole case lies in the wording of the honored opinion of the presiding judge. The 208 page opinion that presented his findings was liberally punctuated with biting "asides" which somehow seemed more appropriate when he hurled them at alleged communist conspirators, not too many weeks ago.

Plastics Go Latin

American plastics manufacturers are showing great interest in expanding their production facilities into Brazil. With the entry of B. F. Goodrich into the field *(CW, Sept. 29)* there are now four major American companies producing plastics, or building plastics plants, in Brazil. All four companies have gone into Brazil in association with local firms.

Monsanto's new subsidiary, Monsanto S.A. Produtos Quimicos e Plasticos, has reached the stage of appointing a general manager from Monsanto's New York office, and expects

to start producing vinyl chloride monomer, and Ultron polyvinyl chloride resins, by late 1952. Koppers entry is a polystyrene plant, and Union Carbide's affiliate, Bakol S.A., has been making polystyrene for some time. All plants are in the Sao Paulo region.

Latin Lure: While not quite a mass migration, the four companies give Brazil a solid plastics industry, and show a strong lure for the chemical industry in Brazil. Monsanto indicates three major reasons for the move: good market, availability of necessary raw materials, and ready Brazilian capital.

American companies have been selling plastics materials to Brazil for some time, and have developed a market that justifies building plants on the spot. Present market is good, and sales contacts indicate a rapid growth in the next few years.

Brazil has long been looking for industries to come to the country and utilize the abundant raw materials. Coke and limestone are readily available, carbide is already produced, and chlorine is easily obtained from Brazilian salt.

In line with its program of encouraging foreign industry, the Brazilian government is helpful and friendly to those that come. Brazilian capital is plentiful for the right industries, and American capital is welcomed for investment.

With all these advantages it is likely that more American chemical companies will consider similar moves.

Musical Chairs

When James Boyd walked up the steps of the Interior Department's Indiana limestone headquarters in Washington after his summer vacation, his mind was already made up—he was going to quit as Bureau of Mines director. Last week it became official when he tendered his resignation to join the executive staff of Kennecott Copper.

While Boyd has joined a steady procession away from Washington, the reason wasn't the usual one of too little money *(CW, Sept. 15)*. Though he'll be getting considerably more than his present $14,000, Boyd decided to leave because of his treatment at the hands of Interior Secretary Chapman.

Boyd felt he had the raw end of intra-departmental squabbles which started over the Defense Minerals Administration and came to a head on the chemicals-from-coal-hydrogenation proposal.

The earlier battle came over DMA. Boyd, who has headed the Bureau of Mines since 1947, also had been asked to take over as chief of DMA, which had responsibility for mineral expansion and stockpiling.

Authority for carrying out the politically hot program was scattered. In addition to Interior, the Bureau of Mines and DMA, the DPA, NPA, OPS, RFC and ECA all had their fingers in the pie. But total responsibility fell squarely on DMA.

Political Pressure: When mineral state politicos exerted pressure for more government money for mineral expansion than DMA had approved, Boyd found himself out of DMA. In addition, most of DMA's executive functions were transferred to Jess Larson's new Defense Materials Procurement Agency. As yet, it isn't established whether DMPA has enough actual power to do any better than DMA.

Boyd was peeved enough with his sacrifice to political expediency. But the final blow came over the coal hydrogenation controversy. Here, it wasn't a matter of "whether" but of "how fast."

Boyd, Secretary Chapman and Dr. Wilburn Schroeder (career bureaucrat—assitsant director of the Bureau of Mines who inherited Boyd's job as chief of DMA) were inclined to look favorably on hydrogenation. Boyd had plugged the research phase and initialed a request to DPA for a $400 million price support fund for production after a contract with Colchem could be negotiated (*CW, Oct. 6*).

Advised Delay: Boyd, unlike the other two, wanted to go slow on actual approval of the project. He wanted to wait 60 days until reports of further research would be available. Chapman and Schroeder disregarded his request and attempted to ram hydrogenation through at once.

The attempt failed, and the project —while far from dead—is in cold storage as far as any government department other than Interior is concerned.

Just the other day, the House Interstate Commerce Committee told Interior that it, too, had better go slow.

Chapman's action was, in Boyd's opinion, the last straw. He left immediately on his vacation, and during this time, he made up his mind to quit.

It's still anybody's guess as to who his successor as Bureau of Mines director will be. One school of thought holds that Schroeder will be stepped up from assistant director. Others, however, believe that Chapman will import someone from industry who has a practical background in the mineral field.

BOYD: From thumbs up to thumbs down.

Farmers' Friend

The sulfur shortage got another working-over last week—from Representative Ben F. Jensen of Exira, Iowa (pop. 1,046). In a release sent to newspapers in his home district, he loudly decries the Government's action in exporting a fifth of our sulfur production.

"Other countries can produce their own sulfur, but they do not do it because they can buy it cheaper from us," he charges. "To satisfy this foreign demand we are exhausting our sulfur supplies.

"Farmers use about 25% of the sulfur we produce," he continues. Used in fertilizers it greatly increases crop yields. For example, if the million tons of sulfur which the Truman-Acheson crowd is putting under British control were used in fertilizer, it would produce an estimated additional billion pounds of beef, or four billion quarts of milk or 125 million bushels of corn."

In writing for his mixed farmer-consumer audience, Rep. Jensen asserts that this additional fertilizer "would increase farmers' income by boosting acreage yield and at the same time make more food available to consumers at lower prices.

"The Administration should withdraw immediately from all of its deals to dispose of sulfur at least until the needs of American farmers are met," he demands. "It was Mr. Truman, Mr. Acheson and Mr. Brannan who got us into this sulfur mess, and now it's up to them to get us out of it."

Pluronic Paradox

Ever since Wyandotte Chemicals Corp. introduced its solid nonionic detergent, Pluronic F68, last year (CI, Nov. 1950, p. 714) there's been a lot of speculation on its chemical makeup. Now, coincident with an expansion of its output, Wyandotte reveals* that it is, paradoxically, an all-glycol product.

When Wyandotte decided ten years ago to add organic research to its long-time inorganic activities, it was natural, in view of the company's position in the field of cleaning compounds, that attention should have been directed to synthetic detergents.

Green Pastures: Wyandotte's first organic detergent, Kreelon, although differing from others, was no pioneer. A sulfonated kerylbenzene, it followed a well-blazed path. But Wyandotte's researchers recognized the commercial possibilities of nonionics—especially if they could come up with a solid.

Nonionics are better in many respects than the more common anionics: They remove some kinds of soil better; they don't foam as much; they are more compatible in various formulations; and they are usually obtained in a higher concentration. Their chief disadvantage—from the viewpoint of the casual user—has been their availability only in liquid or paste form.

Even so, their unique advantages have pushed their output from a frail 15 million pounds in 1946 to a fat 51 million pounds last year; and thus the market potentialities of a free-flowing, dustless, nonionic flake detergent were an intriguing incentive.

The promising door that led eventually to the Pluronics was opened by chance four years ago when a Wyandotte salesman reported a customer's enthusiasm for polyoxyethylene oleate. Wyandotte researchers, well familiar with glycols, set about looking for a competitive product.

Someone got the idea of using propylene oxide instead of ethylene oxide, but the resulting polyoxypropylene oleate was almost completely insoluble in water.

Flash of Genius: Then came what the Patent Office likes to call a "flash of genius": If polyoxypropylene oleate is insoluble, then the polyoxypropylene glycol portion of the molecule must be considerably less soluble than a polyoxyethylene glycol. Why not add ethylene oxide to polyoxypropylene glycol? It worked, and the resultant series of compounds had the proper balance of hydrophobic and hydrophilic portions to exhibit surface-active properties.

Further research explored the variations on this theme. It showed that polyoxypropylene glycols with molecular weights over 1,000 were less than 0.1% soluble, but that addition of sufficient ethylene glycol to comprise 40% of the total weight made the compound completely soluble. At this point the compounds are liquid, but if ethylene oxide content is boosted to 70%, the product is solid (m.p., 51-54 C) and can be flaked on conventional equipment.

Some surface-active properties must be sacrificed in order to get a solid product: Pluronic F68 isn't as good a textile wetting agent as the liquid members of the series, nor is whiteness retention as high in laundering tests.

PLURONICS PLANT: It can easily be enlarged.

MAKING PLURONIC FLAKES: The impetus was a salesman's plaint.

But combinations of Pluronic F68 with an alkyl sulfonate and sodium carboxymethyl cellulose provide a detergent base that does a better job than any of the three alone. When the formulated base is built with sodium tripolyphosphate and soda ash in a 30:45:25 ratio, Wyandotte will put it up against any soap or synthetic detergent now used for household or commercial laundering.

Many Markets: There's a host of other potential uses, too: mechanical dishwashers (where its low foam level makes it particularly suitable); detergent sanitizers (compounded with quaternaries); scouring powders; rug shampoos; textile processing; to increase absorbency of paper toweling; and in dentifrices. Bar detergents are another possibility, as are dry cleaning formulations and other cleaners.

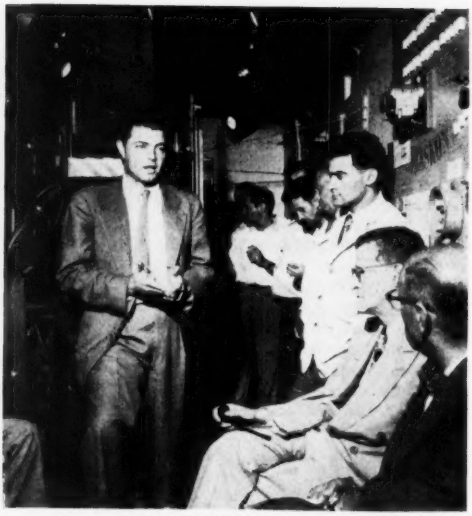
Another surprising use, so far kept pretty well under wraps, is as a plasticizer in cast phenolic resins, to which it imparts flexibility.

Small output has slowed development of many of these promising markets, but Wyandotte is now building a semi-commercial Pluronics plant—due to be operating by the first of the year. The increased production will permit a lot more "developmental" sales, and the plant is designed for easy expansion.

The Pluronics are still the baby of the Research and Development Division, two departments of which—Chemical Engineering and Development—now handle production and sales. But when they can stand on their own feet, they'll go to one of Wyandotte's sales divisions, and thence—the company hopes—to the world.

* In a paper presented this week to the American Oil Chemists' Society.

1 THE TRUCK drives into plant yard, plugs in electric cable, and is ready to demonstrate as the curious gather.



2 DEMONSTRATION BEGINS as company officials listen in comfort to talk on properties of new resin.

5 SPECIALLY DESIGNED Baker press demonstrates the high speed-low pressure molding of compound.

6 QUESTIONS FLY THICK as vice president wants details on the Baker press's 16-second molding cycle.

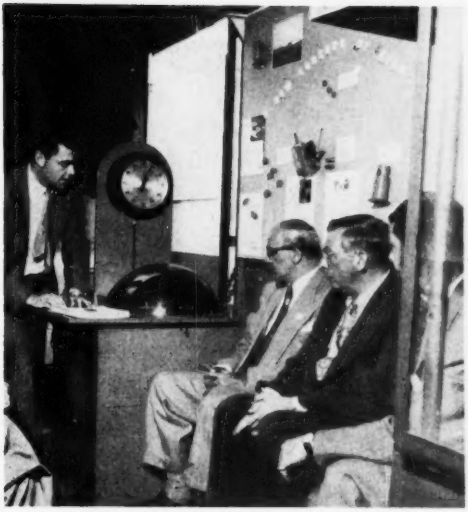
BUSINESS & INDUSTRY. . . . . .

Show-How Pays Off

A unique "molding shop on wheels" is touring the country's plastics plants to demonstrate a new alkyd molding resin developed by the Plaskon Division of Libbey-Owens-Ford Glass Co. Convinced that showing beats telling, Plaskon's Toledo office came up with the new sales device as the best and fastest way to get its sales message across.

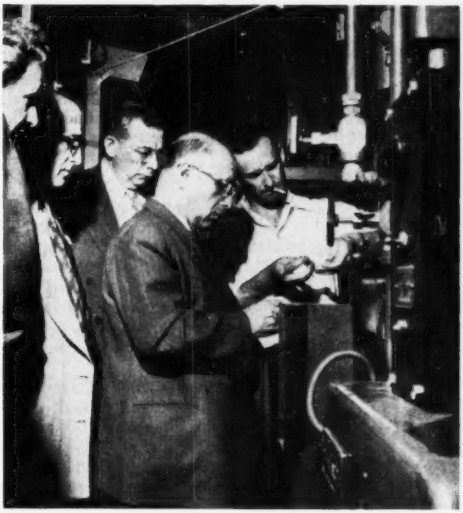
The idea is simple but effective. On a converted trailer truck Plaskon built a complete demonstration unit, consisting of an arc-tester, special Baker press, adapted Stokes press, sample finished products, and an upholstered lounge where potential customers can listen in comfort. Equipped with an air compressor and carrying all necessary materials with it, the truck simply drives into the plant yard, plugs in its electric cable, and is ready to start "selling."

The arc-tester shows the special arc-resistant properties of the new compound. The special Baker press demonstrates the molding speed of the alkyd resin, while the Stokes press gets across the idea that the molder can adapt



3 ARC TESTER shows high arc resistance of new resin by comparison tests with melamine and phenolic resins.

4 ON THE WALLS, demonstrator Lowry points out equipment that makes use of arc-resistant properties.



7 PRODUCT, hot from adapted Stokes press, is examined critically by impressed company officials.

8 TIME—15 MINUTES. Officials, with complete picture, gather to read data, discuss resin's possibilities.

his present equipment to the Plaskon product.

An engineer-demonstrator, O. William Lowry, Jr., travels with the truck, and guides company officials, engineers, and mold designers through the unit. Lowry conducts the demonstrations; gives a short, succinct talk on the properties, uses, and price of the resin; and answers the always-present questions.

Conducted in groups of eight, the entire demonstration takes only 15 minutes. And Plaskon feels that after these 15 minutes the molder knows more about the compound than he would after hours of explaining.

Wide Coverage: The truck will make a trip to any company connected with plastics, whether they are molders or buyers. The head office at Toledo sends a letter suggesting that the truck make a stop at a certain plant. If the reply is favorable, a date is arranged, and the truck arrives to go into its act.

Typical of its stops was last week's visit to the Ideal Plastics Corp., Hollis, N.Y. Ideal, one of the country's largest injection molding companies, is considering expanding into compression molding and welcomed the chance to see the demonstration.

Reaction in the industry has been uniformly favorable, and Plaskon is mighty pleased with the "marvelous" reception. Plaskon's sales department is convinced that they have found the best possible method to show new equipment and materials in the shortest possible time. And, says the company, it's paying dividends.

PETROLEUM SOLVENTS

AMSCO-SOLV • AROMATIC SOLVENTS
AMSCO HEXANE AND HEPTANE

AMERICAN MINERAL SPIRITS COMPANY

155 E. 44th St., New York 17, N. Y.
Chicago • Los Angeles

Atlanta • Boston • Buffalo • Carteret, N. J. • Cincinnati • Cleveland • Detroit • Fort Wayne • Grand Rapids Houston • Indianapolis • Milwaukee • New Orleans Philadelphia • Portland • Providence • San Diego San Francisco • St. Louis • Toledo • Toronto

Tailor-made WAXES by ALLIED

HUNDREDS OF FORMULAS for different types of wax in our files prove that Allied builds the wax formula to suit the product—

- for any temperature — warm or cold
- for any material — metal, rubber, paper, wood or plastics
- for any method of application — laminating, brush, roller-coating or spraying in any form — slabs, drums or solution

Allied starts in where others leave off in the compounding of special waxes. Our highly skilled staff of laboratory technicians are constantly delving into new applications . . . new fields of use. Allied will take any wax problem and give you that worthwhile *extra* in service and results.

WAX AND OIL DIVISION
Allied Asphalt & Mineral Corp.
ESTABLISHED IN 1925

217 BROADWAY, NEW YORK 7 • FACTORY: DUNELLEN, N. J.
AGENTS AND WAREHOUSE STOCKS IN PRINCIPAL CENTERS

ENDACOTT, ADAMS, LEARNED: A solid underpinning of 556 chemical engineers.

Star in Phillips' Crown

Chemical Engineering's eleventh Award for Chemical Engineering Achievement will be presented next month to Phillips Petroleum Co. The two prize-winning jobs-well-done: development of high abrasion carbon black, significant contributions to cold rubber technology. Together they have put synthetic rubber "over the top" for tire treads.

Board Chairman K. S. Adams, President Paul Endacott and Executive Vice-President Stanley Learned head the team that has master-minded the firm's spectacular growth.* But they're the first to give credit to their 556 chemical engineers and the other 1,379 technical men for the achievements that have not only made profits but have also won the votes of the 70 top chemical engineering educators that comprise the Award Committee.

As recently as 1948 tire-makers were looking forward to a better supply of natural rubber—so they could build better tires. Today natural rubber is relatively plentiful and tires are superior—but the latter is no result of the former. Rather, the twin developments of cold rubber and better blacks have enabled the synthetic product to oust natural rubber from top preferment.

Recognizing Phillips' part in this "rubber revolution," Chemical Engineering will present the award at a banquet in New York's Waldorf-Astoria Hotel on November 28. MIT's Karl T. Compton (of the famous Baruch-Compton-Conant team that master-minded the wartime development of synthetic rubber) will speak.

* From a $3 million organization with 27 employees in 1917 to a $700 million corporation today.

FOREIGN. . . . . .

Titanium: Developments concerning vital titanium come from two Far Eastern countries this week. In India, new ilmenite deposits, estimated at 250,000 tons, were reportedly discovered at Ratnagiri, south of Bombay. Informed sources say a European country has already contracted to buy the ilmenite.

The newly discovered sands contain up to 50% titanium, and production is expected to reach 5,000 tons per month by 1952.

In Japan the Osaka Special Steel Co. is studying the possibilities of setting up commercial titanium production in Japan itself. Titanium sands are plentiful, and the company is experimenting with a claimed new method of recovering the metal. The company makes pig iron from iron sand, and its slag is known to contain about 50% titanium.

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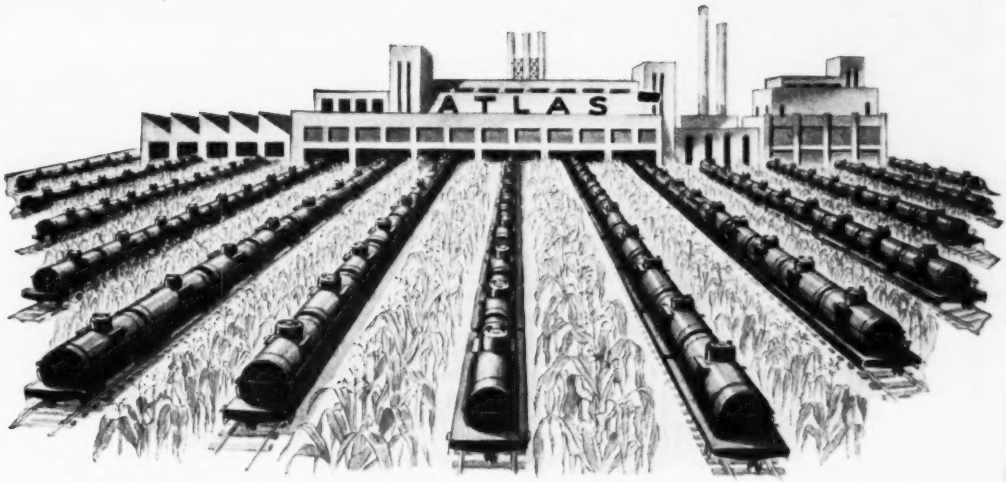
Potash Deposit: From Regina, Saskatchewan, comes word of discovery of the third largest potash deposit in the world, at Vera, 15 miles northwest of Unity. A square mile of deposit holds about 6½ million tons of potassium chloride, engineers calculate.

An experimental plant has been



NOW! Sorbitol is ready

to help you cut your polyol costs!

Big news for manufacturers of resins, tobacco products, adhesives, flexible films, pharmaceuticals!

Sorbitol—the hexahydric alcohol derived from corn sugar and other natural sugars—is now available in quantity from new Atlas plant facilities just completed.

Its price will remain at the same low, stable level . . . unaffected by shortages or inflation since it comes from abundant raw materials and is not a by-product.

A member of the same chemical family as glycerin and the glycols, sorbitol has many unique features of its own. Not a substitute, it must be evaluated on its own merits.

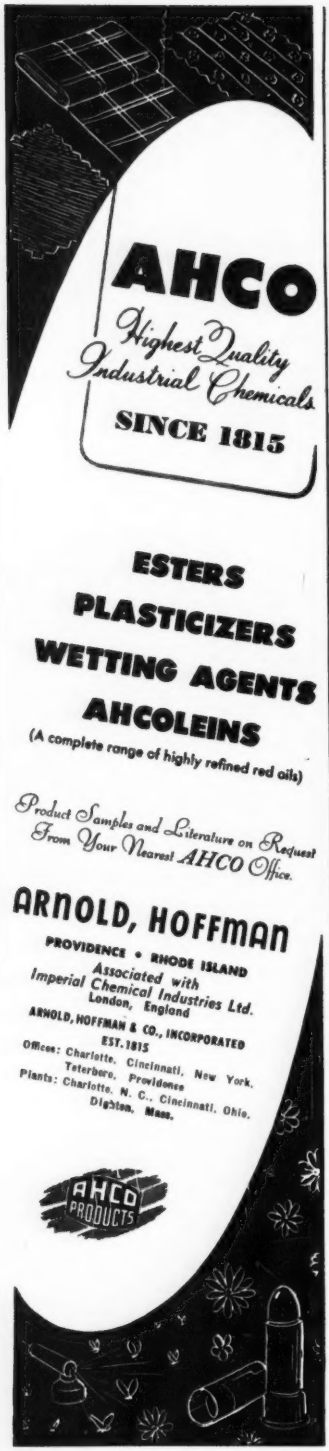
Atlas sorbitol production is now ten times its 1947 volume! And Atlas will expand its sorbitol facilities again as future requirements demand it.

Place your order today for immediate delivery, or write for further information. A new book about sorbitol is yours for the asking. And remember, if sorbitol doesn't quite fit *your* needs, Atlas makes many other special polyol combinations.

ATLAS INDUSTRIAL CHEMICALS DEPARTMENT

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*
ATLAS POWDER COMPANY, CANADA, LTD., Brantford, Canada



BUSINESS & INDUSTRY . . . . . .

started to recover the potassium chloride from the deposit, which contains about 35% potassium chloride to 65% salt.

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Sulfuric Acid: Three widely scattered developments in sulfuric acid production were reported this week. Near LaRochelle, France, one of the largest French sulfuric acid plants is going back on stream after its destruction in World War II. Reconstructed and modernized, the plant will produce 40 tons a day, but will depend on imports for its pyrites supply.

In Canada, The Nichols Chemical Co. has begun a $2½ million expansion project to double the capacity of its sulfuric acid facilities at Valleyfield, Quebec. The new expansion will use Canadian pyrites and other sulfur-bearing ores as raw material.

A pyrite-burning plant is to be a unit in the multimillion-dollar Maria Cristina project in the Phillipine Islands. The 2½ million-peso plant will utilize domestic pyrite deposits from Rapu-Rapu island off the coast of Albay. Another sulfuric acid project at Caloocan is now installing equipment. The equipment came from Japan, and orginally it was planned to import raw materials from that country. But study has led to a decision to use the same deposits of pyrite on Rapu-Rapu island.

EXPANSION . . . .

Surface Coatings: Raffi & Swanson, Inc. has acquired the surface coatings business of the Merrimac Div. of Monsanto Chemical Co. at Everett, Mass. Monsanto states that it plans to intensify Merrimac's production and development of industrial chemicals.

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Ferro-Manganese: Early next year construction work will get under way on a new $1¼ million ferro-manganese plant at Henderson, Nevada. Producer: Combined Metals Reduction Co.

•

Citric Acid: The end of 1951 should see a third manufacturer, Stauffer Chemical Co., of citric acid by fermentation begin production. The new plant, located at Callander, Calif., will utilize molasses as the raw material. The second producer, Miles Laboratories, began operations this summer. The long-time sole prodcer of this material was Chas. Pfizer & Co.

•

Fertilizers: Chilean Nitrate Sales Corp. is rebuilding its fertilizer plant at S. Norfolk, Va. The unit will be a replacement for the plant which was destroyed by fire in June. Tidewater Construction Co. has the contract for the construction.

•

Uranium 235: Union Carbide and Carbon Corp. has signed a contract to operate the Atomic Energy Commission's new $500 million plant for production of uranium 235 at Paducah, Ky.

•

Laclede Christy-Harbison-Walker: The Warm Springs, Calif. plant of Laclede Christy Co. is to be acquired by Harbison-Walker Refractories Co. This unit will allow H-W to enter into a wider field in the production of basic refractories, and later of silica refractories, primarily for the glass industry.

•

Rubber Reclamation: Boston Woven Hose Co. will use an air separation method for reclamation of rubber at its new $1 million plant at Cambridge, Mass. It is expected to be completed within seven months.

•

Odor Elimination: Quaker Oats Co. is scheduled to spend $2 million at its Memphis, Tenn., furfural facility to replace the five boilers in the plant with a single large unit for elimination of odors and fumes produced in the present setup. Furfural wastes make up a portion of the fuel burned under the boilers.

•

Antibiotics: Penicillin and streptomycin are not the only antibiotics whose production is to be expanded by Chas. Pfizer & Co. in its $15 million expansion program. A company spokesman states that a portion of the $15 million is for antibiotic units upon which the company has not obtained certificates. Included in this program is a portion of the plant expansion in penicillin and streptomycin, for which Pfizer has obtained certificates of necessity for over $10 million in new construction. The company has also obtained a $2.35 million certificate of necessity for a citric and oxalic acid plant, at Groton, Conn. which is not included in the above $15 million total.

•

Alcohols, Butadiene & Benzene: Esso Standard Oil Co. will increase its production of chemicals at Baton Rouge, La., in addition to upping the refinery's crude oil processing capacity from 240,000 to 270,000 bbls. per day. Total cost: $35 million.

More iso-octyl alcohol will be manufactured by the oxo process and more by olefin hydration. Esso now produces ethanol, isopropanol and sec-butanol by the latter process. Units for butadiene and benzene complete the chemical expansion.

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Harvey S. Firestone Jr.: Elected vice-chairman, American Petrochemicals Co.

W. D. Gohr: To president, American Petrochemical Corp.

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John N. Street: To vice-president, American Petrochemical Corp.

Edgar M. Queeny: Elected to board, Monsanto (Canada) Ltd.

Charles S. Cheston: Elected to board, Monsanto (Canada) Ltd.

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Raymond Atkins: Elected to board, Monsanto (Canada) Ltd.

Oscar B. Lewis: Elected vice president, Ethyl Antiknock, Ltd.

W. N. Oldham: To manager, Azusa, Calif., plant, American Cyanamid Co.

W. D. Holland: To production manager, agricultural chemicals division, American Cyanamid Co.

Bjarne Klaussen: To executive vice president, Hooker Electrochemicals Co.

Donald E. Springer: To chief engineer, Hooker Electrochemical Co.

R. H. de Greeff, Elected chairman of the board, R. W. Greeff & Co.

Ira Vandewater: To president, R. W. Greeff & Co.

Ted Palmer: From manager, McGraw-Hill West Coast News Bureau, to assistant director, public relations, Kaiser Aluminum & Chemical Co.

Harold L. Straube: From general manager, John Powell Chemical Co., to operations manager, John Powell & Co.

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RESEARCH . . . .

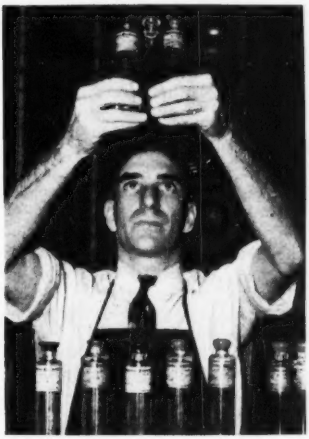
Highly Branched and "Big"

Three new high-molecular-weight primary aliphatic amines and a new amine acetate will be unveiled this week by Rohm & Haas Company. The alkyl group in each is tertiary and highly branched.

The new products will probably make their mark as intermediates in the manufacture of detergents, wetting agents, oil additives, pharmaceuticals, textile chemicals and insecticides.

Amines are in the spotlight this week at Rohm & Haas; the company has made four important additions to its growing alkylamine series. But even more important is the revelation that all Rohm & Haas amines have graduated from the pilot-plant, are now available in truck-load quantities at substantially lower prices.*

At first glance it would appear that



LUBRICATING OILS: For additives, an oil-soluble group.

Rohm & Haas has finally cashed in on its experiments with the tricky Oxo process, but the company says it's not so. Oxo research is still under way, but the new amines are definitely not Oxo products.

The new members, labeled Alkylamine JM-R, Alkylamine JM-T and Alkylamine 81-T are tertiary-alkyl amines.

They are all mixtures of isomeric products; JM-R and JM-T average 18 carbons in chain length, 81-T ranges from 12 to 15 carbon atoms. The acetate of Alkylamine JM-T completes the foursome.

These alkylamines are all highly branched primary amines in which the nitrogen atom is bonded to a tertiary-alkyl configuration. The branched-chain structure has certain advantages over its linear counterpart: Greater solubility in paraffinic solvents and improved solubility of salts are perhaps most striking. Handling properties also benefit; all of the free amines are clear, mobile liquids, easily poured over a wide range of temperature. Color stability is good.

Third-Degree Influence: Reactivity of the amines and their reaction products are influenced to a large degree by the tertiary-alkyl grouping. For example, stable, distillable azomethines are obtained by reaction with formaldehyde; stable tertiary-alkyl cyanamids, by combination with cyanogen chloride. Because of the steric hindrance of the tertiary-alkyl, reaction with alkyl halides, acrylonitrile and acrylic esters are easily controlled to give substantially pure monosubstitution and addition products.

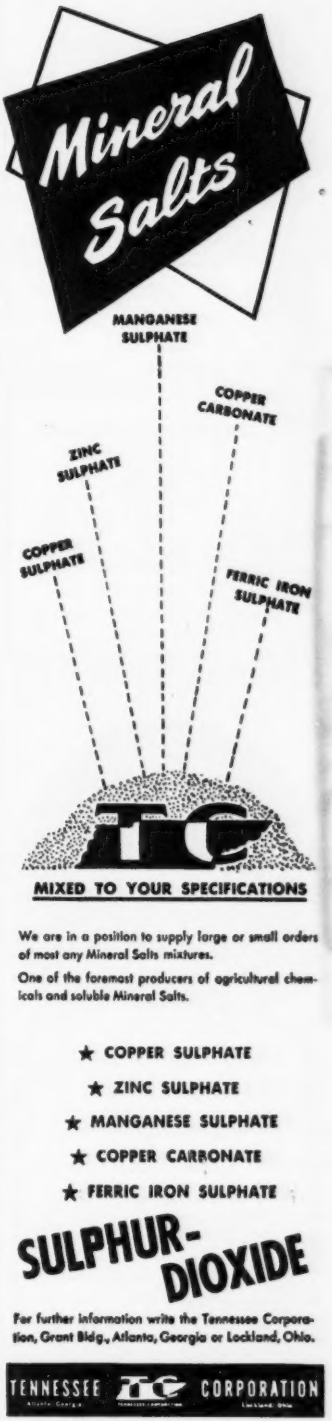
Although reactivity in the amine series generally decreases with increasing molecular weight, the new products readily take part in such ionic reactions as salt formation.

Because of their chemical behavior, Alkylamines JM-R, JM-T and 81-T seem destined for a place in chemical manufacture.

Already these novel products have shown promise as intermediates in the preparation of corrosion inhibitors, bactericides, insecticides, fungicides, wetting agents, detergents, textile finishing agents, emulsifiers and pharmaceuticals. Moreover, the alkylamines' ability to introduce oil-soluble groups into many organic compounds should find application in the development of new antioxidants and other oil additives.

Although outnumbered by the free amines, Alkylamine JM-T Acetate isn't overshadowed. It shows marked surface activity, looks good as an oil-soluble dispersing agent. JM-T Acetate's cationic nature and surface activity should attract interest in the fields of ore flotation and emulsification. In addition, the acetate is bac-

* Reductions average 15 to 20%.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By-Passing The Mold

Researcher John C. Sheehan and associates at Massachusetts Institute of Technology have recently reported the first successful syntheses of penicillin analogs with chemical and physical properties corresponding closely to the penicillins.

The fused β-lactam-thiazolidine structure—heart of the penicillin molecule—was formed by the interaction of phthaloglycyl chloride and 2-phenyl-2-thiazoline in the presence of triethylamine. Three series of the fused ring compounds were synthesized each progressively approaching penicillin in structural complexity.

Methyl-5-phenyl (2-carbomethoxyethyl) penicillinate is reported to be the closest analog yet synthesized.

Threat To Tung

A new fast-drying oil, now being evaluated at India's National Chemical Laboratory, is being boosted as superior in many respects to scarce tung oil. Extracted from the seeds of the Indian Kamala tree, the oil dries to a natural wrinkle finish without the application of heat.

Kamala oil in itself is nothing new. It has been probed by researchers of India's Forest Research Institute since 1940. But it never got anywhere in the commercial market because of a costly extraction process. Now the Institute reports a simple method of extraction, by-passing expensive organic solvents.

With renewed interest in the oil, the National Chemical Laboratory has begun an investigation of applications. Its discovery that the oil wrinkles on drying should open the door to a substantial market in wrinkle-finish paints.

The Kamala tree is abundant in Bengal, Bombay and many other localities. The government will soon begin a survey of the quantity of Kamala seeds available in Indian forests, methods for their systematic collection and economic extraction.

All In The Cards

International Business Machines Corp. has developed a new electronic device that should take the eyestrain and writer's cramp out of tedious literature searches. But the biggest dividend will come in terms of saved time: The new machine takes information from IBM cards at the rate of a thousand cards a minute.

Right now, only one experimental model exists, but it has proved successful in trial runs and may well be the first of a long line of jiffy searchers.

Here's how it operates. A book, article, or paragraph is condensed and translated in terms a specially developed code consisting of 792 characters. This data is then transferred to IBM cards. When information is desired, a question card is given to the machine which then scans the questions and comes up with the right answer cards.

Although the device will be welcomed by researchers in many sciences, the chemists will probably put it to best use. An obvious application is the search for specific types of structure. The quest for substances which could be transformed into cortisone involved time-consuming surveys of thousands of previously reported materials. Searches of this kind may soon be routine to a score of tireless electronic eyes.

"Plasticized" Gasoline

Spark plug fouling has been a headache to the airlines for a good many years. The magnitude of the problem has kept pace with the growth of the industry; today it is a costly and aggravating thorn in the side of both military and commercial aviation. But relief appears to be in sight. Shell Oil Co. has come up with a new gasoline additive which effects a striking increase in the pre-fouling life of the plugs.

Suspecting that cause of the trouble was to be found in the fuel, Shell researchers set out to track down the culprit in a carefully planned investigation at the company's Wood River (Ill.) Research Laboratory.

A spark plug fouling test procedure was developed using a four cylinder light aircraft engine operated under simulated cruise conditions known to cause severe fouling in the field. Using fuel containing 4 ml per gallon of standard tetraethyl lead mix, backfiring and other noisy evidences of fouling occurred in about four hours.

Two plugs—one fouled, the other still serviceable—were removed from the test engine and given a thorough going over. The fouled plug, which conked out after four hours, had a small quantity of deposit on the ceramic core; the unfouled plug, still going strong after 24 hours of engine operation, showed still heavier deposits. Preliminary analysis disclosed the bulk of the deposits to be lead oxybromide. But it was apparent that this substance couldn't be the bad actor since the plug with the greater

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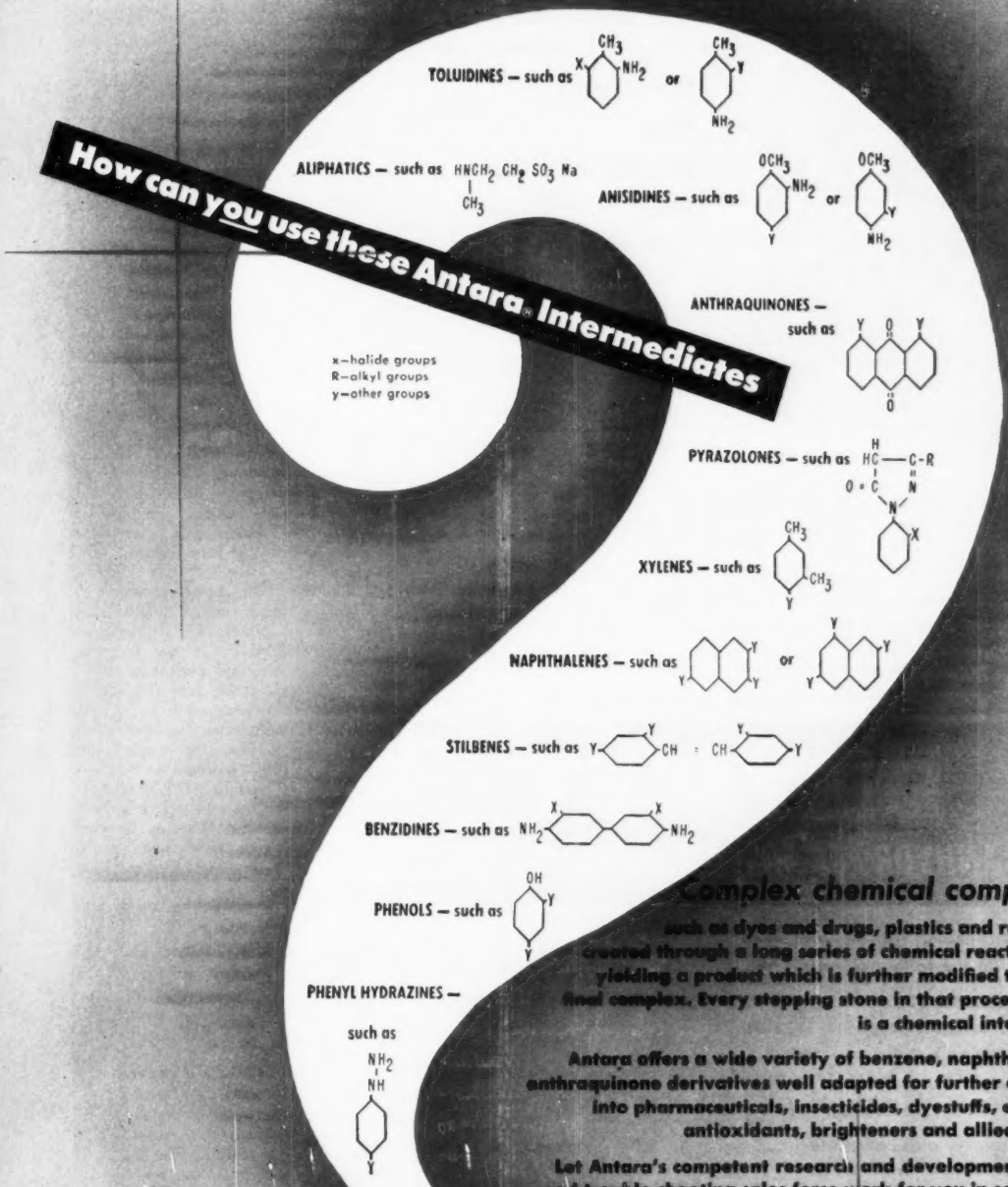

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RESEARCH . . . . . .

load was still in good running condition.

Further probing turned up metallic lead on the fouled plug, but none on the unfouled. Carrying their project into the field, the researchers had a look at the spark plugs of planes suffering from chronic fouling. Sure enough, they found lead on the sick plugs, none on the sound. Obviously, lead is a prime causative factor. It is formed by the reduction of lead oxybromide deposits with free carbon resulting from incomplete fuel combustion. Other materials (e.g. iron) in the combustion chamber also can reduce the oxybromide.

Blame EDB: From their results the Shell workers deduced that the ethylene bromide (EDB), incorporated in the "ethyl" fluid to scavenge the lead from the cylinder, was not doing a thorough job. It took care of the bulk of the lead, but the small amount it missed did the damage. Additional EDB was tried with little success; the same was true of lead-dissolving solvents.

The search then turned to improved additives. After many months and and many hundreds of trials, the project hit pay dirt in the common plasticizer, tricresyl phosphate (*CW Newsletters, July 28, Sept. 22*). Incorporating this compound in a new scavenger formulation, the researchers went back to their test engine and got an 1,100% increase in foulless operation. The new Shell scavenger has just come through engine ground tests at Pratt and Whitney Aircraft Division and is now being flight tested. It's still too early for hard-and-fast conclusions, but Shell readily admits that early results are promising.

•

Antioxidant Probe: Relationship between molecular configuration and antioxidant efficiency of phenols was the subject of recent research by Esso Standard Oil of Louisiana and Esso of N. J.

The most effective phenols for stabilizing mineral oils were those having tertiary butyl groups in the 2- and 6- positions and a normal alkyl group in the 4- position. The effectiveness of these compounds rises with an increase in the number of carbon atoms in the normal alkyl substituent para to the hydroxyl group. Decreasing the branching or number of carbon atoms in the groups at 2- or 6- lowers antioxidant activity.

•

Light On Viomycin: Researchers at Parke-Davis & Co. have found that the amino acid serine appears to be a major structural component of the

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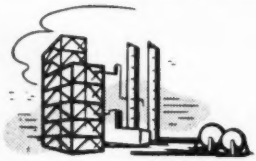

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RESEARCH . . . . . .

viomycin molecule. Further investigation of the antibiotic disclosed that it has an empirical formula of $C_{18}H_{31-38}N_9O_8$; it is strongly basic and probably a polypeptide; in addition to serine, which is recovered from an acid hydrolysate, the molecule also appears to contain a guanidine unit.

•

Concrete Result: A study of cement additives at Battelle Memorial Institute, Columbus, O., has shown that concrete containing 10% of copper acetoarsenite inhibits the growth of molds. This mixture proved about four times as effective as copper-containing oxychloride cement, even after extensive leaching.

•

Research Boost: International Minerals & Chemical Corp. is constructing a $1 million research laboratory near Chicago to further its nutritional investigations. The company recently organized a pharmaceutical department to promote and market by-products of its glutamic acid production.

•

New Fungicide: Capryldinitrophenyl crotonate has just been patented (U.S. 2,526,660) as a fungicide.

•

Photo Formaldehyde: Development of photographs is the latest addition to formaldehyde's bag of tricks. Members of the Photographic Society of America will get the details from Polaroid Corp.'s George Ehrenfried at their Detroit convention this week.

•

Dextran News: Professor Maurice Stacey of England's Birmingham University has given the American chemical industry a pat on the back for its efforts with dextran. But he made it plain that the biggest research advances were happening abroad. According to Stacey, recent improvements in England have altered the whole situation as regards controlling molecular structure, making the newest types of dextran "more useful and nearer the objective of being an ideal blood extender".

•

New Vitamin: Lester J. Reed, University of Texas biochemist, and I. C. Gunsalus of the University of Illinois report the isolation of alpha lipoic acid, first of the lipoic acid family of B vitamins.

•

Longer Life: Researchers of Upjohn Co., Kalamazoo, Mich. have shown the hormone β-cyclopentyl propionate to be more active physiologically for a longer period of time than the presently used testosterone propionate. Toxicity is about the same.

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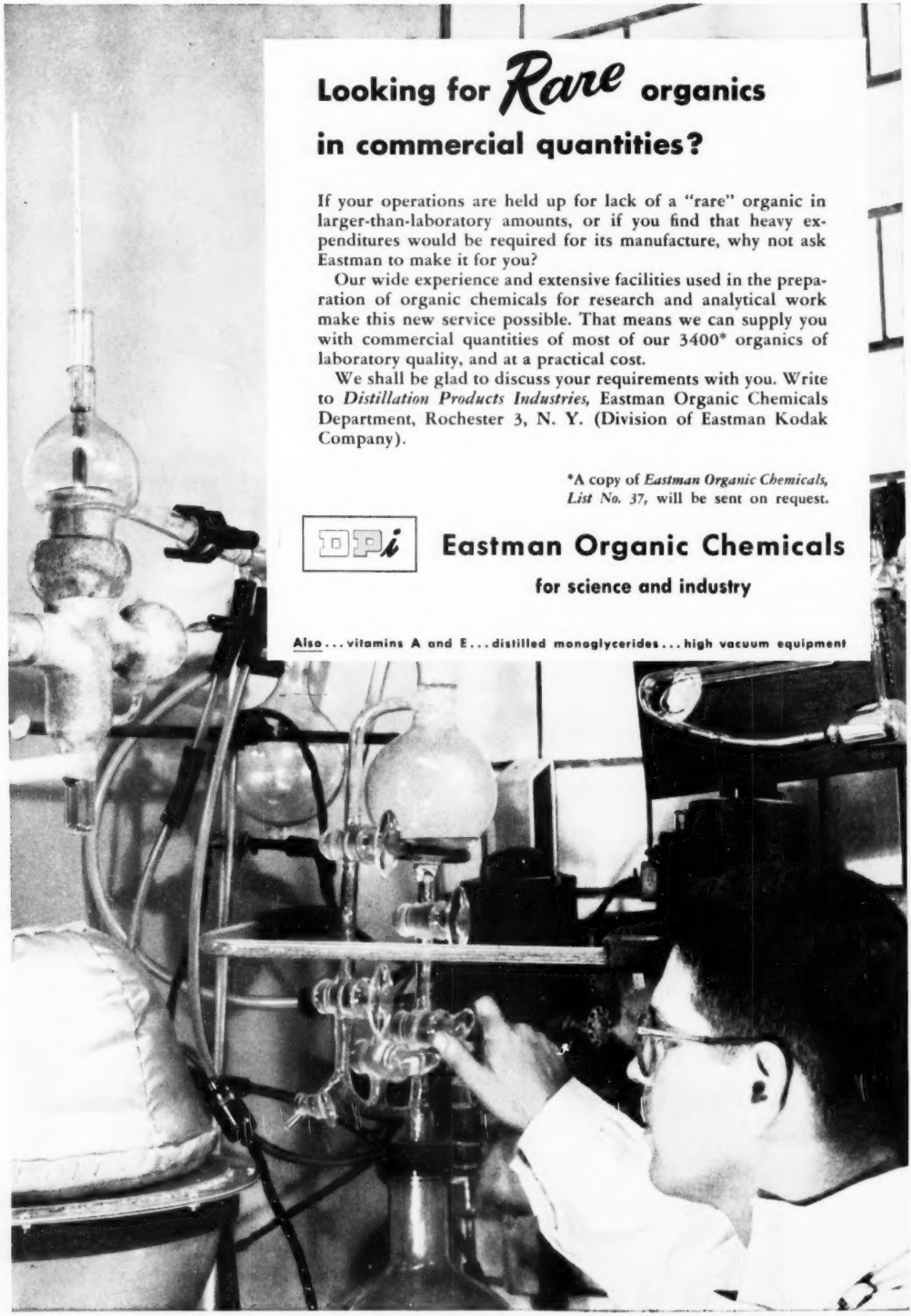

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We shall be glad to discuss your requirements with you. Write to *Distillation Products Industries,* Eastman Organic Chemicals Department, Rochester 3, N. Y. (Division of Eastman Kodak Company).

*A copy of *Eastman Organic Chemicals, List No. 37,* will be sent on request.

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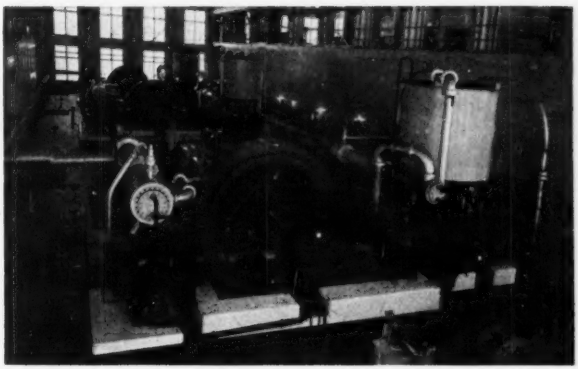


FERTILIZER: Gypsum (l) with ammonia and carbon dioxide from ammonia synthesis (r) gives ammonium sulfate.

Gypsum, Not Sulfur

Partial shift to gypsum as sulfate source in synthesis of ammonium sulfate may be presaged by new plant in India.

Process is also being considered for U. S. but the calcium sulfate would be derived from triple superphosphate sludge.

Ammonium sulfate is derived by reaction of ammonium carbonate (ammonia, carbon dioxide) with calcium sulfate.

Recent developments in the United States and in India have drawn new attention to the manufacture of ammonium sulfate for fertilizer from calcium sulfate and ammonium carbonate. The process, unused in the United States, has long been employed in England, and in Germany where it was first commercialized.

At Sindri, about 125 miles northwest of Calcutta, a new 1,000 ton-a-day ammonium sulfate unit is now being placed into operation for the Ministry of Industry and Supply of the Indian Government. The necessary ammonia will be synthesized from coal at the plant site, while the calcium sulfate (gypsum) is to be brought from mines in the southern part of India. The ammonia plant also provides the huge tonnages of carbon dioxide that are required to form ammonium carbonate from the ammonia. Designed by Chemical Construction Co. under a license from Imperial Chemical Industries, Ltd., the plant was erected by Power-Gas Corp., Ltd., an English firm.

Houston, Texas, is the site of current American interest in the process. There Phillips Chemical Co. is investigating the possibility of producing ammonium sulfate from the calcium sulfate sludge of nearby triple superphosphate plants and ammonium carbonate. Presumably the latter would be derived from the carbon dioxide and ammonia output of the newly-formed Alamo Chemical Co.'s proposed ammonia synthesis unit (*CW, Sept. 15*). However, Phillips states that no definite plans have been formulated.

Century Plus: This process should be celebrating some sort of an anniversary. It was first tried out in Austria in 1809 to produce ammonium sulfate to serve as a raw material for manufacture of ammonium chloride, but without success. After this start the idea lay dormant for exactly a century. In 1909 its application by the gas works industry was considered, again without success. However, a commercial unit was finally installed by Badische Anilin and Soda Fabrik at Oppau in the Rhineland during World War I. A second German plant was constructed at Leuna in Saxony and both ran successfully until the bombings of World War II. Oppau is again operating, while the fate of Leuna, now behind the Iron Curtain, is not known.

After the war plants were set up in England, first by Brunner Mond & Co. (now I.C.I.) at Billingham in 1923. A second English plant was erected during World War II at Prudhoe. The operation of these units provided the know-how for the new Indian plant.

Ammonium Carbonate First: Technologically, the simplest part of the process is the preparation of the ammonium carbonate, but economically it can easily throw a monkey wrench into the whole works. Problem: provision of large volumes of low-cost carbon dioxide that are necessary for economic survival of the process. An ideal spot is adjacent to an ammonia synthesis unit which has large volumes of carbon dioxide without any place to go. The location of the new Indian plant fits this specification.

The major operating problem in the plant is the reaction of the ammonium sulfate solution and the finely ground calcium sulfate. An excess of the carbonate is employed to shift the equilibrium in the direction of maximum production of ammonium sulfate. Despite this, and other precautions, the reaction takes five hours when carried out at 70 C.

The calcium carbonate that is precipitated is filtered from the reaction mixture with rotary filters. In England it is used as agricultural limestone and in the manufacture of cement.

Before the ammonium sulfate can be crystallized, excess ammonium carbonate must be removed by heating the solution issuing from the filters. This takes place in a salting type evaporator. Materials of construction are a major problem at this stage of the process and lead-lined or chrome-nickel steels must be used for surfaces in contact with the liquor.

Old Becomes New: Raw material shortages (sulfur) dictate technologic changes. But the change need not be a new process. It can be the refurbishing of an older process whose progress has been stopped by the hurdle of high cost.

Repair, Don't Scrap

Salvage of metal parts and equipment by metallizing is coming in for greater interest from chemical industries these days. Reason: allotments, priority problems, defense needs, and general short supply of metals.

To speed up the operation Metallizing Engineering Co. has come up with two improved metallizing guns, designated the 4E and 5E, which have the highest spraying speeds yet available, improved wire feed, and the nearest thing to completely automatic operation yet devised.

Metallizing consists simply of feeding wire of the desired metal into the gun, where it is melted by an oxy-acetylene flame, and sprayed on the worn area by compressed gas. The 4E gun will spray any metal up to 40% faster than previous models, and the 5E is the first gun designed to spray soft metals.

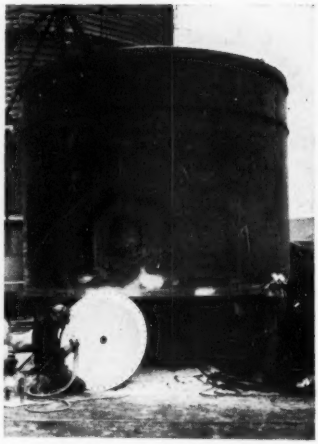
Proved Saving: By metallizing a worn or corroded part, up to 75% of the cost of replacement can often be saved. The salvaged part may even be better than the original, since special high-cost metals can be used in the spray that would be uneconomic for the original part. But the big factor today is the ready supply, and the time saved. Instead of having equipment stand idle for days or even months waiting for a hard-to-get replacement part to find its way through the tangle of allotments, the part can be metallized in a matter of minutes or hours.

Long proven effective in the repair of worn machine elements, shafts, rolls, pumps, and other parts subject to wear, metallizing has found many special uses in chemical plants.

Many, But Not All: Problems peculiar to chemical equipment can be solved by metallizing, but not all by any means. It is no panacea, and drawbacks become sharply apparent when chemical men start asking questions.

The new 5E Metco gun is designed to provide a corrosion resistant coating, but chemical engineers aren't going to get much help from it. The gun sprays zinc, aluminum, and other low-melting-point metals, of little use for protecting against the corrosion in chemical processes. Metallizing guns spray stainless steel, monel, chromium, and other corrosion resistant alloys, but there is a catch: These metals need finishing, which rules the method out for such uses as lining tanks and other large pieces of equipment.

But on small parts worn by corrosion, metallizing can be a boon with alloy steels and other anti-corrosion metals at a premium today. Paper and textile mills have successfully used metallizing guns to spray monel, nickel and chromium, and Davison Chemical Corp. found metallizing the answer to the problem of corroded fluorine exhaust blower fan blades, by applying to them a coating of hard stainless steel.



PHENOL TANK: Tin saves it.

Cracks in glass-lined tanks can be repaired by sandblasting (to clean the crack) and then filling the crack with copper or molybdenum from a metallizing gun.

By coating its magnesium melting pots with stainless steel, Dow found a way to prevent corrosion, and Du Pont sprays aluminum on steel for its heat corrosion problems.

These, and other uses peculiar to the chemical industry, are making chemical men take notice. It is worth the try to adapt metallizing; that's the word in chemical plants as engineers look at the metal situation.

High Temperatures

Industry's search for the best metal for a given use at high temperatures will be greatly aided by the huge mass of data accumulated by the Development and Research Div. of the International Nickel Co. (Inco). Data is available on non-nickel-containing materials as well as on nickel alloys.

Inco has developed a Work Sheet to serve as a ready method of formalizing requests for information and to make certain that no significant questions are overlooked.

Data provided by the Work Sheet will be of particular assistance to those in industry who (1) have a new process under test that involves corrosion at high temperatures; (2) wish to compare the performance of presently used materials against that of possible alternates; (3) require a metal to replace a material which is no longer available.

Lignite Limitations

Despite the high promise of a low temperature carbonization process (CW, Aug. 18) for generation of cheap power with lignite, an increasingly large number of BTUs will continue to be developed from lignite or subbituminous coals without carbonization. And correctly designed equipment is a must if complete and efficient combustion of these coals is to be attained.

The high moisture content (up to 40%) of lignite makes combustion a tough job. The fuel must be dried for good results, either by preheating the combustion air to 400 F for drying in the furnace before burning, or by predrying the lignite before it enters the combustion chamber. Further, fuel must enter the furnace in a level uniform thin bed with continuous automatic discharge to the ash pit. These specifications are met by a conveyor type furnace with a non-agitating grate surface.

Rapid combustion is dependent upon the speed with which the fuel can be ignited. And the necessary conditions for this rapid burning are met by the foregoing combination of preheated combustion air and thin fuel bed.

Cost Is Low: The low cost of the power that can be generated by furnaces of this type in combination with the low initial cost of the strip-mined fuel are going to cause many companies to take a second look at hitherto ignored plant sites in the lignite-rich Dakotas, Wyoming, Montana and Central Texas. For chemical companies there is also the additional potential bonus of a ready and relatively unlimited supply of aromatic chemicals if low-temperature carbonization is employed.

Time Saver

Time required for movement of a sample from the plant to the analytical laboratory has been dropped to a minimum at the Rensselaer Works of General Aniline & Film Corp. The time reduction is provided by a new installation of pneumatic dispatch tubes, which were produced by Lamson Corp., to move the sample from one point to another.

★

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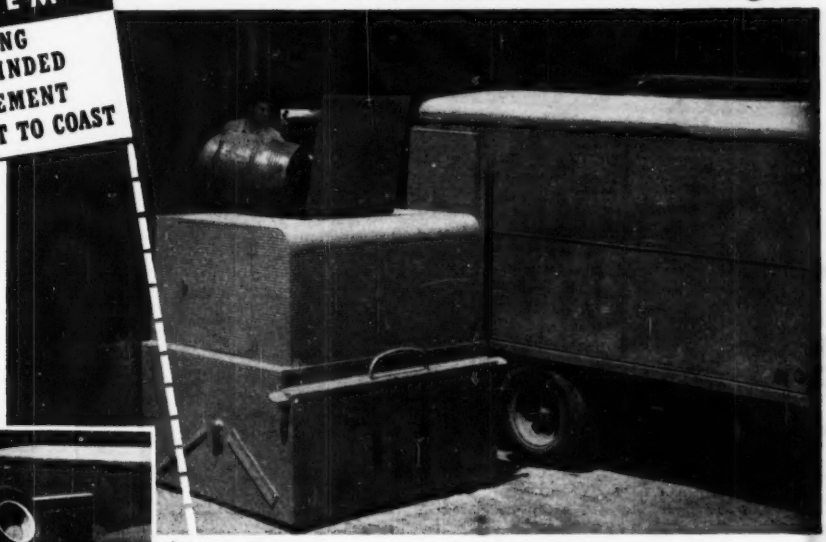

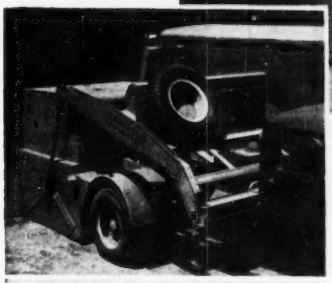

Photos show a Universal Type Container being loaded, Dempster-Dumpster ready to pick it up and place it in carrying position, and container being emptied. Entire operation is handled hydraulically by means of controls at driver's seat.

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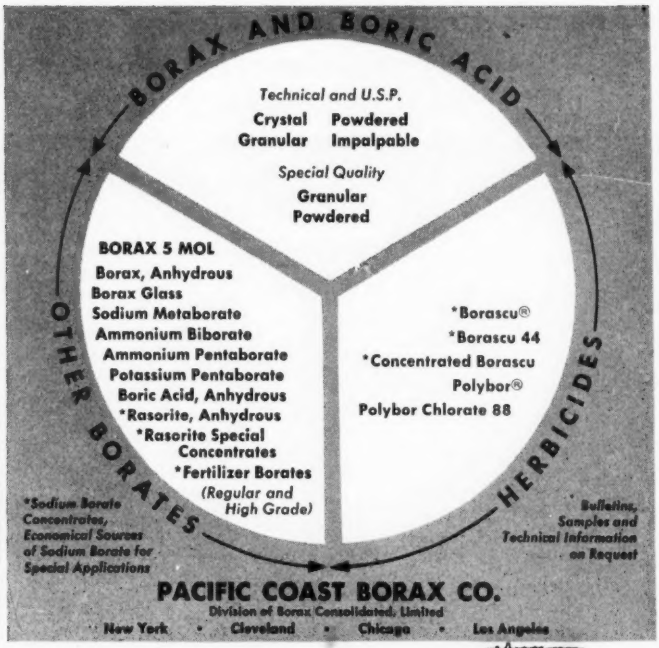

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Reports from the laboratory are returned in the same manner. Thus the unsatisfactory messenger system is replaced by pneumatic tubes that are available for use at all times.

EQUIPMENT. . . .

Condensation Return Units: New single and duplex condensation return units, said to effect a considerable saving in fuel by returning the condensate from steam coils, radiators, or steam operated equipment back to the boiler, are being sold by The Deming Co.

Known as "Motor Mount" units, the new equipment has standard NEMA type "C" mounting flanges, and is furnished for single phase, two or three phase, or direct current, as specified.

•

Manometer and Flowmeter: The Hastings Instrument Co. claims to have come up with an entirely new-type electronic manometer and flowmeter, capable of measuring extremely low pressure differences. The new manometer has no glass or plastic tubes, contains no fluid, and operates from a noble metal thermopile.

The instrument may be used for direct indications or attached to a recorder; may be used with long extension cables; and can be permanently installed since it is not damaged by high pressures.

•

Immersion Heaters: General Electric has redesigned two Calrod immersion heaters for nickel and copper plating baths, and for mild sulfuric acid and chrome plating baths.

By replacing the old-style sealing cup with a new vapor-tight junction-box of terminal housing, greater flexibility and portability have been achieved.

Advantages of the new immersion heaters: ease of installation, long life, portability and a quarter-inch lead sheath which protects the heaters from corrosive action.

PICTURES IN THIS ISSUE:

Cover (top-left)—World Wide, (top-right) — Karsh Photo, (centre) — Lyn Crawford, McGraw-Hill Co., (bottom)—Duncan-Ryan; p. 14 — Harris & Ewing Photos; p. 15—Wyandotte Co.; pp. 16 & 17—Lyn Crawford, McGraw-Hill; p. 33 (right)—Cominco Photo; p. 39—Maurey Garber Photo.

Follow through

"To get distance," an old pro once told us, "you've got to follow through."

We think that makes good sense in business, too. So we're not content just serving our customers' day-to-day needs. Our Market Research Department, for instance, looks ahead . . . studies their growing needs . . . and we expand to meet them.

That's why we can take care of our customers of record with soda ash in times of long or short supply.

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CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE
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SULPHUR

*Interesting Facts Concerning This Basic Raw Material from the Gulf Coast Region

*MAN MADE MOUNTAINS

Sulphur from the field collecting stations is delivered to the vats through insulated pipe lines which discharge directly on the vats. The sulphur is pumped at such a rate that the height of the vat is increased only a few inches per day, the slight vertical rise being the result of a large horizontal area which provides maximum cooling surface and ample tonnage capacity. As the sulphur solidifies it gradually builds up into a great block or vat of solid sulphur, which may be as large as 1200 feet long, 50 feet high, and 200 feet wide, and containing as much as half a million tons of sulphur.

The discharge lines are placed so that the liquid sulphur is spread in an even layer over the entire surface of the vat and is permitted to solidify uniformly. If the liquid sulphur is introduced too rapidly or is not properly distributed, pockets of liquid sulphur will be covered by a crust and remain in the solid sulphur. The low heat-conductivity of sulphur might keep such pockets liquid for a year or more.

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Mines: Newgulf and Moss Bluff, Texas

Sweetness Sans Sucrose

It's saccharin vs. Sucaryl in battle for synthetic sweetener market. Recipe books for over-the-counter-trade argue taste, heat stability; plug appetizer-through-coffee use.

New saccharin producer claims "no bitter after-taste" in latest bid for diabetic, calorie-counter dollars.

Keeping a little sweetness in the lives of diabetics and overweight people who must avoid carbohydrates is an obscure but profitable service of chemical producers. For years, saccharin (benzosulfimide) made from toluene has done the job.

In the spring of 1950, however, Sucaryl (sodium cyclohexyl sulfamate), a new product of Abbott Laboratories, hit the market. Sucaryl's "no bitter after-taste" and heat stability at baking or boiling temperatures were plugged in Abbott's then-novel recipe book.

The product has been well received, and the company has just bolstered its position in the field with the calcium salt of Sucaryl for those on salt-free, as well as low-sugar, diets.

But saccharin is far from being counted out. A new producer, Maumee Development Co. of Toledo (*CW, Sept. 15, Oct. 6*) is elbowing into the field, will use a new process based on phthalic anhydride instead of toluene as the starting material.

Pre-Insulin: Nor has Monsanto Chemical Co., saccharin pioneer (saccharin was its first product), and still the largest producer, stood idly by as the higher-priced Sucaryl cut into the sugar substitute market. Early this year it countered with its first recipe book designed to promote use of the sweetener in cooking and baking. This states that saccharin is stable at all cooking temperatures, tells how to prepare dishes that are sugarless yet sweet.

This is but a continuation of the long fight Monsanto has made for saccharin since the turn of the century when doctors began to recommend no-sugar diets for certain illnesses. About 400 times sweeter than sugar, and non-caloric, saccharin was the answer for many diabetic and overweight cases.

Zealots of the sugar industry and FDA campaigned against the "poisonous coal-tar product" from the start. Although a board appointed by Teddy Roosevelt found saccharin harmless, a prohibitive clause remained in the 1906 Pure Food and Drug Act and finally a regulation against its use was pressured through. Monsanto fought the regulation in court for 12 years until saccharin was finally given a clean bill of health in 1925.

The 1938 Food, Drug and Cosmetic Act, however, requires saccharin-containing foods to be labeled as prepared for diabetics. This is in line with the FDA's long-held opinion that using, in food products, a sweetening agent which has no food value constitutes adulteration since it robs the consumer of expected calories.

Although calorie counters and diabetics swallow 50-70% of production, saccharin has other industrial applications. Use in tobacco, adhesives, dentifrices, pharmaceuticals and bottled beverages (not sold in interstate commerce) brings figures for sweetening consumption up to 90%. The remaining 10% goes for chemical purposes such as Udylite Corp.'s patented plating bath brightener.

Down and Up: The discovery of insulin, of course, had some effect in decreasing dietary use. Many diabetics didn't like saccharin, preferred insulin or a sugarless diet. Although insulin requirements double every six years (due to better diagnosis, increasing awareness, longer patient life), saccharin production has only quadrupled in the past 25 years.

During World War II demand (especially foreign) boomed, and several new producers entered the field. Sugar shortages drove black market saccharin prices up to $30 a pound; and large amounts of lend-lease material went to sweeten Russian soldier morale. As soon as demand decreased, however, most of the new makers dropped out. Producers now include Heyden Chemical, Lapaco Chemicals, Inc., and, of course, Monsanto. Maumee apparently thinks there is room for at least one more producer.

Matter of Taste: Current sales appeals are based on what is more a personal sense than a material property: taste. Abbott has pushed Sucaryl as having no bitter after-taste in ordinary use; yet above 0.8% concentrations, it is said to taste bitter.

SUGAR SUBSTITUTE: No bitter with the sweet.

Some people have complained about saccharin, yet there have been countless satisfied users to whom bitter after-taste, real or imagined, has been of no concern. And these saccharin tablets have been on the market under a number of brand names for years. But Maumee will make its bid for a share of the market on an improved taste claim.

Whatever the reason, Sucaryl has made a good start in the time it has been on the market. Abbott doesn't consider sales spectacular, but does point to a steady sales increase since its introduction, and places present level at about 200% above corresponding months of last year. Up to now it has concentrated on over-the-counter sales; only a small amount of bulk powder has gone to dietary manufacturers.

Sucaryl is sold as the sodium or calcium salt in both tablet and liquid form. An eighth-gram tablet contains, in addition to Sucaryl, sodium bicarbonate and tartaric acid; is equivalent to a teaspoon of sugar.

To date no unfavorable reactions have been found. The compound also has the unique distinction of having been given a clean bill of health before the Delaney Committee: A. J. Lehman, FDA's chief of pharmacology, in straightening out a Sucaryl-using congressman who was confused by the similarity between it and "sucrol", another synthetic sweetener which FDA views with disfavor, remarked, "The compounds are entirely different. Sucaryl came through with

flying colors and I have no apprehensions about its safety."

Large Market: Both saccharin and Sucaryl are competing for a sizable market. The American Diabetes Association estimates that there are about one million known diabetics; one million undiscovered cases; and two million "potentials"—those who may become diabetics. All of those being treated are on diets, and about 70-75% take insulin. Many, of course, use either saccharin or Sucaryl to have palatable, yet safe, meals.

There are many more obese people, however—some 26 million adults in this country, according to the Metropolitan Life Insurance Co.'s latest study. And there is a growing awareness among medical people of the importance of overweight as a contributory cause in death from heart disease and high blood pressure. Although most diets are largely a matter of balancing foods, cutting down on carbohydrates is generally recommended. This month, an American Medical Council will consider means to this end: whether to tell the patient to use will power, or to buy a non-food sweetener.

No matter what its decision is, there will be at least 26 million potential consumers of sugar substitutes in this country alone. Their individual taste buds will determine the pattern of future sales.

Get the Eye

The FDA this week stepped up a new campaign concerning shampoo products containing surface-active agents. FDA agents seized shipments of "Godan," a shampoo preparation made by La Maur, Inc., of Minneapolis, which the agency says is similar to two shampoos seized earlier (*CW, Sept. 8*). In addition, a "fourth firm" has begun recall of its product following notice from the FDA. (FDA won't further identify the firm.)

The seizures, as part of an enforcement program, apparently stem from complaints that the shampoos injure the eyes. Other parts of the program include circularizing each shampoo formulator—warning him to look into his complaint file. If it indicates that his products may be harmful to the eyes, "some action on his part would be advisable," FDA cautions.

The FDA, since being alerted to possible problems with surface-active agent use in shampoos, has been testing them, but as yet has not given them a "clean bill of health." It may, however, approve all, or certain classes, following investigation.

The agency is reluctant to identify what surface-active agents are contained in the seized products, "explains" the situation: "If we say a certain particular one caused the injury, it may have the effect of causing some people to think that the unnamed ones are all right. On the other hand, by naming only those so far seized, the guilty label is pinned on only a few when the rest are just as guilty."

FDA warns cosmetic formulators against using components that their suppliers do not identify. "No cosmetics manufacturer should use any ingredient whose nature is unknown. If the supplier won't tell the customer [formulator] what's in it, or what its effect might be on a human being or on any organ of the body in case of accidental contact, the cosmetic manufacturer has no business using it."

Oil Well Cement

A new clay cement designed to close off permeable zones in oil wells to prevent loss of drilling muds has been developed by the Field Research Laboratories of Magnolia Petroleum Co., a Socony-Vacuum Oil Co. affiliate. These drilling muds, used for lubrication of drill the bit and for carrying off cuttings, are expensive, and such losses through porous or cavernous underground formations often run as high as $50,000 per well.

The new product is essentially an aqueous slurry of a specially selected clay, a smaller amount of an aluminum silicate to increase the strength of the clay after it sets, and a retarder for increasing the time during which the slurry can be pumped before it sets.

In use the clay is pumped down into the permeable zone either by standard cementing equipment or mud pumps, depending on the formation. It soon becomes plastic with sufficient strength to seal off the zone against mud losses during subsequent drilling.

•

Brush Cleaner: G. N. Coughlan (West Orange, N.J.) has just brought out a new paint brush cleaner which the company claims is so effective that it is possible to clean a brush that has been used for black paint and immediately use it for white paint.

•

Asphalt Union: American Bitumuls Co. and Sancal Asphalt & Bitumuls Co. have joined to form a nationwide firm to sell and manufacture paving and special asphalt products. Both are subsidiaries of Standard Oil of California, will now be know as American Bitumuls and Asphalt Co., headquartered in San Francisco. American Bitumuls formerly operated only east of the Rock Mountains and Stancal, only in the West.

•

West Lease: West Disinfecting Co., Long Island City, N.Y., has leased a site at Woodbine, Cape May County, N.J., but says that there is no construction definitely contemplated for the site now.

•

Powder for Nylons: Newest item for nylon stocking comfort is being test-marketed in Chicago, Detroit and Cleveland. It's Drylon, made by The Scholl Mfg. Co.—standby in the corn and bunion field.

Poetic push at hosiery counters of dime and department stores states, "If you wear nylon, you need Drylon." Shaker can retails at $1 (4 oz.), is applied all over from knees to soles.

Active ingredients are: colloidal hydrated aluminum silicate, orthohydroxybenzoic acid, starch ester, essential oils. Claim is for high moisture absorbency to eliminate stocking dampness common with nylons.

•

Clorox in Charlotte: Clorox Chemical has decided to go ahead with its Charlotte, N.C., plant to make hypochlorite bleach for Carolina area distribution (*CW, July 21*). Ground for the $250,000 installation has just been broken; it's expected to be in operation within four months.

•

Fire at Stedford: A two-story warehouse of Stedford Chemical Co., Fayetteville, N.Y., was nearly destroyed in a recent fire at the company's sodium hypochlorite plant.

•

$4 Million Plant: Colgate Palmolive Peet this week opened a new plant in Kansas City for production of toilet articles. The building, with 193,000 square feet of floor space, is one of the first large industrial projects completed since the Missouri floods.

•

Wyeth's Plans: If negotiations go through, Wyeth, Inc., will construct administrative headquarters and research laboratories on a 19-acre tract in Philadelphia Main Line's Radnor township. The company's $1.5 million penicillin plant at West Chester, Pa. is nearing completion.

•

Culligan Consolidation: Plant, laboratory and office facilities of Culligan Zeolite's Northbrook, Ill., operations will be consolidated next week with the opening of a new $375,000 unit. Tank fabrication and filling facilities have been greatly expanded.

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DELIVERIES—Most of the Hooker Chemicals listed here are readily available now. Others will be available in the near future. Your Hooker sales representative will be glad to keep you posted on the current delivery situation.

TANNERS use some of these Hooker chemicals to: soak hides prior to unhairing, remove hair quickly and safely; others are used to adjust pH of processing solutions, preserve hides and skins from attack by moths, fungus and other organisms.

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HOOKER ELECTROCHEMICAL COMPANY

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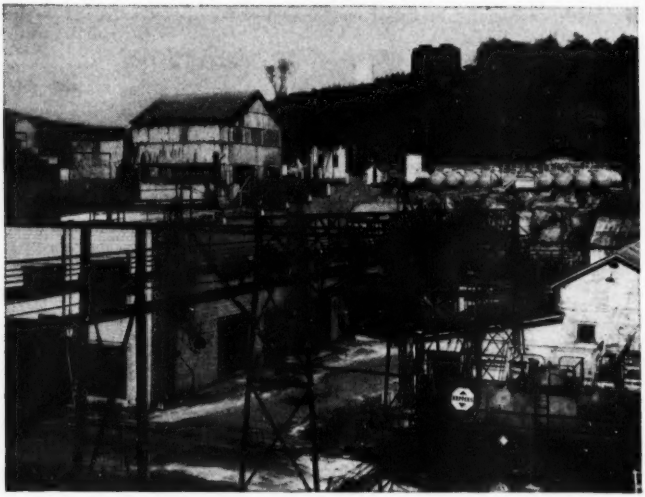
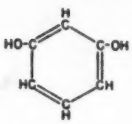


More Resorcinol for Defense!



...Koppers expands its production facilities

● Through expanding production facilities, our Chemical Division plans to manufacture more Resorcinol. Distribution of Koppers Resorcinol is now governed by Schedule 6 under NPA Order M-45.

Many end products, resulting from the reactions of Resorcinol, are essential to the defense effort. Typical products: explosives, medicinals, pharmaceuticals, woodworking adhesives, dyestuffs, textile and leather chemicals—plus compounds that make rubber adhere better to fabrics and cords.

The versatile nature of Resorcinol stems from its high reactivity; the three hydrogen atoms adjacent to the hydroxyl groups are particularly reactive. As a result, Resorcinol undergoes many interesting and unusual reactions in addition to those typical of phenol—reactions which may suggest new and undeveloped commercial possibilities to you.

Koppers Resorcinol is manufactured in two grades. Koppers Resorcinol, Technical, for most chemical manufacturing and processing use, is produced in flake form with a minimum purity of 98.5%. Koppers Resorcinol, U.S.P., for medicinal and pharmaceutical applications, is in the form of fine crystals with a minimum purity of 99.5%.

FOR FURTHER INFORMATION, send for Bulletin C-9-124. This Bulletin describes many of the interesting and unusual reactions of Resorcinol, as well as its physical properties, chemical properties and uses.

KOPPERS

KOPPERS COMPANY, INC.
Chemical Division, Dept. CI-10-13
Koppers Building, Pittsburgh 19, Pa.

BOOKS.....

Punched Cards, edited by Robert S. Casey and James W. Perry. Reinhold Publishing Corp., New York, N.Y.; viii+506 pp., $10.

Calling to attention the tremendous and ever-increasing mass of technical and scientific information in the world today, this book points to the use of punched cards as mechanical aids in handling and deriving maximum benefit from these data. The authors stress the applications and possibilities of punched cards in advancing the art of information analysis. Both hand-sorted edge-punched cards and the machine-sorted cards are discussed here but the first are treated in more detail as to operating procedures and techniques. This book covers the fundamentals, history, future possibilities and bibliographical sources of punched cards.

Briefly Listed

DUTCH CHEMICALS AND PHARMACEUTICALS AND THEIR MANUFACTURE, second edition containing list of Dutch chemical and pharmaceutical concerns, along with products they manufacture, an alphabetical list of products and four indexes. Volume is complete with English, French, German and Spanish translations. From Bedrijfsgroep Chemische Industrie, 2 Javastraat, The Hague, Holland, $2.90.

MEETINGS..

Amer. Assn. of Textile Chems. & Colorists, annual meeting, Statler Hotel, New York, N.Y., October 17-19.

Inst. of Gas Technol., annual meeting, Chicago, Ill., October 18.

Natl. Assn. of Corrosion Engrs., South Central Region, annual meeting, Corpus Christi, Tex., October 18-20.

Southwide Chem. Conf., Wilson Dam, Ala., October 18-20.

Packaging Inst., annual forum, Commodore Hotel, New York, N.Y., October 22-24.

Assn. of Cons. Chems. & Chem. Engrs., annual meeting, Shelburne Hotel, New York, N.Y., October 23.

Natl. Paint, Varnish & Lacquer Assn., Chalfonte-Haddon Hall, Atlantic City, N.J., October 29-31.

Natl. Pest Control Assn., annual meeting, Statler Hotel, Boston, Mass., October 29-31.

Paint Industries Show, annual FPVPC meeting, Chalfonte-Haddon Hall, Atlantic City, N.J., November 1-3.

Amer. Petroleum Inst., annual meeting, Stevens Hotel & Palmer House, Chicago, Ill., November 5-8.

Amer. Drug Mfrs. Assn., Waldorf-Astoria Hotel, New York, N.Y., November 8-9.

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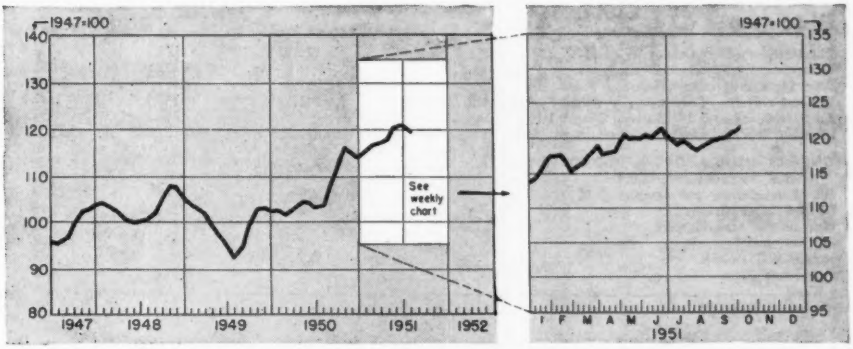
CHEMICAL MARKETS....



CW Index of Chemical Output—Basis: Total Man-Hours Worked in Selected Chemical Industries

Two key chemical market worries this week involved the government. One concerned what the government has done; the other, what it hasn't.

Squarely in the "hasn't" column is this fact: Washington hasn't decided how to control prices. The Capehart Amendment, which at least possessed the virtue of being a positive plan, is dead. And so a big vacuum in price legislation remains to be filled.

Pricing most likely will revert to a modified GCPR by default—until OPS can come up with dollars-and-cents ceilings. Price ceilings on plentiful chemicals, however, may be less than present allowances.

At present, OPS is surprised that supply and demand changes have forced prices below the present ceilings. Despite OPS's "economy of scarcity," free markets are far from dead.

Worry over what government has done comes on a new lead and zinc price order. Under the order, buyers can't legally pay more per pound than 19¢ for lead and 19½¢ for zinc produced or sold outside the U.S.

Canadian producers have agreed to sell lead at 19¢, but other foreign producers have been asking—and getting—at least 22¢ on the world market. Non-Canadian imports (which account for almost half U.S. needs) won't stay at present levels if the world demand holds up.

Two of the three biggest uses for lead: pigment and TEL, both already in short supply.

Zinc, selling for as much as 30¢ on the world market, finds main chemical use in pigment manufacture. U.S. dependence on zinc imports isn't as large as in the case of lead, but the pinch will be definite.

Last week's antibiotic price reductions were followed this week by Armour's dropping ACTH prices 25%. Reason: process improvements.

Allethrin also came in for a price cut. The 90% grade of this synthetic pyrethrin produced by Benzol Products, Newark—and sold by McLaughlin Gormley King of Minneapolis—was lowered from $55 to $42.50 per pound. Carbide and Carbon Chemicals, at present the only other major producer, isn't talking now about reductions.

Safe bet: still lower prices when more Carbide and new U.S.I. capacity come in.

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947=100)	122.2	121.9	116.5
Bituminous Coal Production (Daily Average, 1000 tons)	1,842.0	1,823.0	1,935.0
Steel Ingot Production (Thousand Tons)	2,035.0	2,051.0	1,960.0
Wholesale Prices—Chemicals and Allied Products (1926=100)	141.0	141.1	129.9
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	254.0	252.2	191.1
Chemical Process Industries Construction Awards (Eng. News-Record)	$51,692,000	$95,152,000	$8,809,000

MONTHLY INDICATORS—PRODUCTION (Index 1935-1939=100)	Latest Month	Preceding Month	Year Ago
All Manufacturing and Mining	218	213	209
Durable Manufactures	269	266	247
Non-durable Manufactures	194	189	195
All Chemical Products	307	304	269
Industrial Chemicals	558	553	458
By-product Coke	176	178	167

Washington shelved its plans for aiding synthetics when wool prices dropped, but now it may bring them out again.

Government aid for synthetic fibers, presently in the freezer, may be thawed soon. An active wool market has recovered much of the ground lost in summer's wool price dive.

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Also in textiles, current slowdown in rayon production has brought lessening in glacial acetic acid needs.

Overall glacial demand has remained firm, however, since other users have taken up rayon's slack.

There may be some interesting market developments in butadiene-styrene latices. Continental Paint Co., (Chicago), has quietly begun commercial production of an exterior emulsion base paint, has stolen a march on other—and bigger—manufacturers.

Other paint makers have been field-testing butadiene-styrene latex type emulsions for as long as five years, but none has hitherto launched full scale production. Continental's entry may bring them on the market in force . . . and soon.

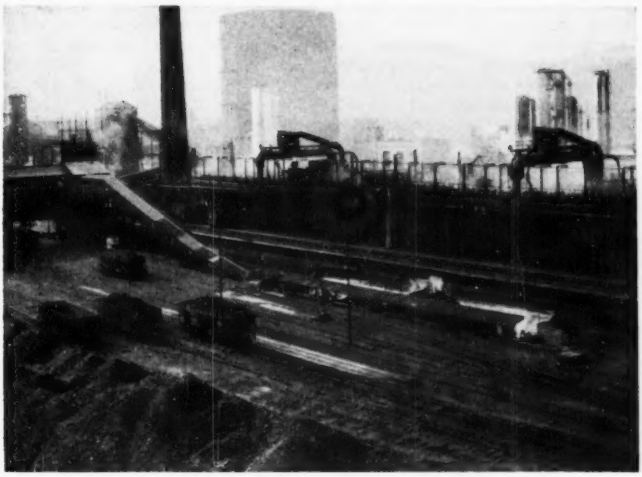
That will mean a boost in demand for several paint components, especially rubber latices and extended titanium pigments.

In short: Natural methanol antifreeze will carry the same ceiling prices as synthetic methanol products . . . OIT will limit sulfuric acid exports to 900,000 pounds (100%) during fourth quarter . . . Crude botanical drugs produced in U.S. are exempted from price control.

SELECTED CHEMICAL MARKET PRICE CHANGES — Week Ending October 8, 1951

UP	Change	New Price		Change	New Price
Castor Oil, USP, tanks	$ .02	$ .3375	Cobalt	$ .30	$2.40
Turpentine, gum, NY, tanks, gal.	.005	.885			
DOWN					
Allethrin, 100%, dms. wks.	12.50	42.50			

All prices per lb. unless quantity is stated.



COKING OPERATION: A small offspring has growing pains.

Crossroads for Quinoline

New markets loom for quinoline as needs mount for mildew-proofing. Foremost customer: armed services.

Bigger demand for niacin and niacinamide could squeeze quinoline supplies, but competition now looms from other processes.

New coking facilities will bring more quinoline, but producers move with caution until market outlook clears.

Frankly, the coal tar processors aren't sure what to do about quinoline. For the first time in many years, demand far exceeds supply. Reason: defense needs in mildew-proofing. But the tar processors, chary of a sudden bursting of this defense balloon, are not rushing to invest in greater recovery facilities. They are not anxious to be "holding the bag" if the government cuts back on orders.

Pentagon Paragon: In its anti-mildew campaign, the military now relies heavily on quinoline derivatives, notably copper 8-hydroxy quinolinolate. The tar distillers can't estimate this demand, since that would depend on climatic factors as well as the size of the armed forces. But it can be said that demand today is sufficiently strong to keep many high-priority orders on the waiting list.

At least three companies are buying quinoline from the tar processors to make this mildew-proofing agent. They are: Gamma Chemical Corp., whose output is sold through Fisher Chemical Co., Inc.; Metalsalts Corp.; and Monsanto Chemical Co. Monsanto has just completed an expansion to make more of this copper salt.

Sales policies of the tar processors vary. Reilly Tar & Chemical Corp. converts a good part of its quinoline output into the copper salt. Barrett Division of Allied Chemical & Dye Corp. sells the commercial 2° grade of quinoline, makes other quinoline derivatives from the 1° product. Koppers Co., Inc., sells practically all the quinoline made there.

Civil Must Wait: These suppliers are trying to cope with the non-deferrable defense needs, while not slighting the use of quinoline derivatives in feed supplements. The output of nicotinic acid (niacin) and niacinamide is well below the market saturation level. Although the vitamin business is growing steadily, even faster development is slated in these supplements for flour enrichment and livestock feed additives. Niacin and niacinamide are especially prized in the hog belt, making the pigs grow bigger faster, and combatting enteritis as well.

By Other Means: Of course, expansion of these uses may run into competition. There are other ways of obtaining quinoline derivatives, and

NIAPROOF
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WATER-SOLUBLE
ALUMINUM ACETATE
POWDER
35.5 to 37% Al_2O_3 Content

For the manufacture of water-repellent preparations, NIAPROOF aluminum acetate is readily soluble in water so that any strength of solution can be prepared as required.

ADVANTAGES OF NIAPROOF POWDER OVER SOLUTIONS:

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No more losses due to precipitation of solutions. High aluminum content available gives dependable results time after time.

PURITY
No injurious sulfates or chlorides to tender the fabric. No contamination or discoloration from containers.

SAVINGS
Lower cost per pound of Al_2O_3 content. No leakage losses on transportation and storage. Lower freight due to negligible water content. Lower handling and storage costs. Containers can be re-used or re-sold.

For further information write to:

Carbide and Carbon Chemicals Company
A Division of
Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N.Y.

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other products give similar results. For instance, one company had been making niacinamide from pyridine, now has gone over to a new process based on acetaldehyde and ammonia. The use of substituted quinolines in promising new anti-malarials might also be the signal for more process rivalry.

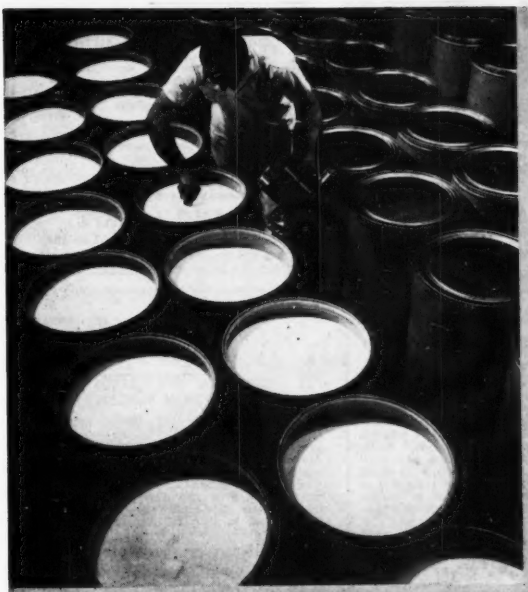
But until demand shows signs of letting up, all roads to more quinoline and its derivatives will be welcome.

GOVERNMENT NEEDS

Bid Closing	Invitation No.	Quantity	Item
Chief Procurement Division, Supply Service, Veterans Administration, Washington 25, D.C.:			
Oct. 16	A-22	576 btl.	Hydrochloric acid, 1 lb.
		375 ctn.	Soda Lime, 37 lb.
		1248 btl.	Sodium chloride, 1 lb.
		624 btl.	Pilocarphine hydrochloride, ⅛ oz.
		120 btl.	Pilocarphine nitrate, ⅛ oz.
		672 btl.	Potassium hydroxide
		312 btl.	Potassium iodide
		648 btl.	Phenol
		3096 btl.	Methanol
		560 cans	Magnesium sulfate
Oct. 24	M-100	384 cans	Clear lacquer
		330 cans	Lacquer thinner
		1,212 cans	Turpentine
		216 cans	Varnish
		470 cans	Varnish shellac (of several types)
Navy Purchasing Office, 111 East 16th Street, New York, N.Y.:			
Oct. 15	9611	3,000	Charges, fire extinguisher
Oct. 17	9606	360,000 lb.	Calcium carbide
Oct. 19	9574	2,666 gal.	Disinfectants, germicides, fungicides
	9615	720,000 lb.	Sweeping compounds
Oct. 24	9633	11,000 lb.	Sodium cyanide
	9634	6,000 lb.	Tannin, quebracho
	9642	100,000 lb.	Soap powder
Oct. 25	9639	12,600 lb.	Hydrogen peroxide
Agricultural Bank of Greece (Permanent Procurement Committee), 23 Venizelos Ave., Athens (through Commerce Department field offices):			
Oct. 17		80 long tons (acid equiv.)	2,4-D weed killer, amine
		170 long tons (acid equiv.)	2,4-D weed killer, sodium salt
Economic Cooperation Administration, 806 Connecticut Ave., Washington 25, D.C.:			
Oct. 17	84-370-00-H209-2218	over 400,000 btl.	Antibiotics, including penicillin forms, dihydrostreptomycin, aureomycin, and chloromycetin.
Aviation Supply Office, 700 Robbins Ave., Philadelphia, Pa.:			
Oct. 19	B-54159-B	350,000 gals.	Interior fire retardant paint
N.Y. Quartermaster Procurement Agency, N.Y.:			
Oct. 15	52-324-B	45,000 lbs.	Marine glue (in 300 lb. bbls. or drums)

GOVERNMENT AWARDS

Item	Supplier	Location
Chemical Corps, U.S. Army, New York Chemical Procurement District, 111 East 16th St., New York 3, N.Y.:		
Chloracetophenone (CN) solid	Federal Laboratories, Inc.	Pittsburgh, Pa.
Zinc Oxide, Grade II, Class A	Eagle-Picher Sales Co.	Cincinnati 1, Ohio
Ordnance Tank-Automotive Denter, Detroit Arsenal, 28251 Van Dyke Avenue, Center Line, Mich.:		
Plastic, cellulose-acetate, butyrate, type 11	Evens-Thompson Mfg. Co.	Detroit, Mich.
Acid, Sulphuric (for storage batteries) (not furnished)	J. C. Miller Co.	Grand Rapids, Mich.
Bureau of Ordnance, Washington 25, D.C.:		
Ethyl cellulose inhibiting tape	The Natl. Plastics Prod. Co.	Odenton, Maryland
Primer, paint	Frey-Yenkin Paint Co.	
Plastics, transparent acrylic sheet	Frank W. Dunne Co.	
	Rohm & Haas Co.	
Oakland Quartermaster Procurement Agency, QM Purchasing Div., 124 Grand Ave., Oakland, Calif.:		
Rodenticide	The Jones-Hamilton Co.	Oakland, Calif.
Soap Powder	The Procter & Gamble Dist. Co.	San Francisco, Calif.
Shortening	The Procter & Gamble Dist. Co.	San Francisco, Calif.
Soap	The Procter & Gamble Dist. Co.	San Francisco, Calif.



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P 2162
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CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

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CHEMICAL ENGINEER—Degree plus three years practical experience, to handle position of Assistant Production Manager. Experienced in synthetic detergents, fats, oils, etc. helpful. Position is with expanding Chemical Company in metropolitan area and offers excellent opportunity for future. Good starting salary. Write, giving full resume, to Box P-2160, Chemical Week.

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WANTED 2 Technically trained salesmen with a minimum of 2 years industrial experience to represent a national Eastern industrial fats and oils manufacturer who is a leader in the field. A following in paint, varnish, lacquer, rubber, plastics and grease compounder fields would be valuable. Must be willing to travel and move to territory assigned. SW-2129, Chemical Week.

POSITION WANTED

PROCESS and Product Development Engineer—24 years experience in inorganic chemicals with large and small firms. Experienced in research and development, production, plant management, sales. Cost reduction, markets and sources of materials. Age 44, Engineering Education, Salary $6,000. PW-1924, Chemical Week.

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McGRAW-HILL PUBLISHING COMPANY, INC.
By J. A. GERARDI, Vice Pres. & Treas.

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(SEAL) ELVA G. MASLIN
(My commission expires March 30, 1952)

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HOW TO USE COUPON

Circle page numbers of items about which you want more details. Then write your name and address on the coupon at the bottom of the page and mail it to us. Your request will be forwarded to companies concerned, the answer coming direct to you.

MAKES IT HANDY

Products and literature in this issue are listed on these pages. There are three indexes. (1) Editorial items on new products, new equipment, new literature; (2) products advertised. (3) The index of advertisers is on the following page.

THE NUMBERS

Advertisements:—There is a page number on the coupon for each advertisement. Before the number, may appear, L, R, T, B (left, right, top, bottom), locating the ad on the page; small letters following (a,b,c) indicate additional products in the advertisement.

Editorial Items:—Numerals are page numbers; the ABC's distinguish among items where more than one is on a page. There is a number on the coupon for each item referring to new products, equipment, and literature.

PRODUCTS ADVERTISED

Chemicals

Aconitic acid L2
Ahcoleins L20d
Alkaterge-C 12
Aluminum acetate powder water-soluble R47
Anhydrous sodium metasilicate B28
Aniline 10-11
Animal oils TL26a
Borax T36a
Borates T36c
Boric acid T36b
Calcium chloride I
Citric acid 49
Diphenylacetic acid 6
Elimental phosphorus 24
Esters L20a
Fatty acids TL26c
Fine R23
Herbicides T36d
Industrial L4b
Industrial aromatics & chemicals BL26
Intermediates 27
Isopropylamine 9
Lead acetate 22
Mineral salts R25
Nitric acid 54
Oils B30a
Organic & inorganic 37
Petroleum solvents TL18
Plasticizers L20b
Plasticizers PX 31
Reactive silica gel 53
Rare organic 32
Resins B30b
Resorcinol, bulletin C-9-124 42
Solvents R1, 44
Sorbitol 19
Sulframin E. 29
Sulphur 38
Tanners 41
Toluol T30
Vegetable oils TL26b
Wax, 150 5
Waxes BL18
Wetting agents L20c
Drums, stainless steel 43
Filters, chemicals, continuous vacuum 3
Filter aids, purified cellulose, salka-floc T28
Materials of construction L4a
Protective coatings, vinyl resins 21
Trucks, dump, bulk materials handling 35

SEARCHLIGHT SECTION

(Classified Advertising)

PROFESSIONAL SERVICES 48

EMPLOYMENT
Positions Vacant 50
Selling Opportunities Offered 50
Positions Wanted 50

BUSINESS OPPORTUNITIES
Offered 50

EQUIPMENT—CHEMICALS
(Used or Surplus New)
For Sale 48, 50

WANTED
Miscellaneous 48

ADVERTISERS INDEX
Chemical Service Corporation 48
Consolidated Products Company, Inc. 50
De. Bear Incorporated 48
First Machinery Corp. 50
Goodenow-Morley Co. 50
Neuberg Co., Inc., William D. 48
Perry Equipment Corp. 50
Truland Chemical & Engineering Co., Inc. 50

EDITORIAL ITEMS

For more data, circle number on coupon

NEW EQUIPMENT

Condensation Return Units 36A
Immersion Heaters 36C
Manometer and Flowmeter 36B

TECHNICAL LITERATURE

CHEMICALS

Iodine 52A
Preservatives 52B

EQUIPMENT

Colorimeter 52C
Filters 52D
Filtration Equipment 52I
Linear Transducers 52E
Liquid Level Gages 52H
Mills and Mixers 52K
Oxygen Combustion Bombs 52L
Synchronous Motors 52G
Tractor-Shovels 52J
Water Conditioning Equipment 52F

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COMPANY _____

ADDRESS _____

CITY & STATE _____

Editorial Items

36A	52A	52D	52G	52I	52K
36B	52B	52F	52H	52J	52L
36C	52C	52F			

Advertisements

1	L4b	12	L20c	24	BL26	T30	32	T36c	41	R47
R1	5	TL18	L20d	P25	27	B30a	35	T36d	42	49
L2	6	BL18	21	TL26a	T28	B30b	T36a	37	43	53
3	9	L20a	22	TL26b	B28	31	T36b	38	44	53
L4a	10-11	L20b	R23	TL26c	29					

Expires January 13, 1952.

BOOKLETS . . . . . .

Chemicals

Iodine

74-p. booklet covering the history, occurrence and production, physical and chemical properties and technical applications of iodine; three important types of iodine reactions are discussed here—those in which iodine is used as a catalyst, those in which iodine and its compounds act as process reagents, and thirdly, those in which iodine is an essential constituent of a product because of its particular properties. Chilean Iodine Educational Bureau.

Preservatives

Booklet discussing copper and zinc naphthenates utilized for the protection of cellulosic materials against mildew, rot and fungus damage as well as for the preservation of wood products, textiles made from cotton, linen, jute and hemp and other fibers of cellulosic structure. Naftone, Inc.

Equipment

Colorimeter

20-p. bulletin featuring photoelectric instrument for colorimetry and nephelometry, also adaptable for the measurement of fluorescence and reflection; the construction and operation of the colorimeter as well as that of accessories is explained. Photovolt Corp.

Filters

8-p. bulletin outlining the operation, filter type, features and application of 21 filters, along with detailed descriptions of 15 of these filters; filters covered include corrosion resistant filters, hooded and jacketed filters, plus laboratory and pilot-plant filters, and acid-handling and diaphragm slurry pumps. Oliver United Filters Inc.

Linear Transducers

Data folders containing information on the operation features, electrical data, available types and wiring diagrams of differential transformers, designed for use where highly accurate measurements of motion, from a few micro-inches up to 5 inches are required and where minute forces are available and friction of any kind would be a disadvantage. Automatic Temperature Control Co., Inc.

Water Conditioning Equipment

4-p. bulletin describing firm's industrial water conditioning equipment such as various models of demineralizers, dealkalizers, water softeners, heaters, degasifiers, water filters and water storage tanks applicable for boiler feed, process and other industrial needs. Penfield Manufacturing Co., Inc.

Synchronous Motors

6-p. folder explaining construction features, ratings, modifications and performance of firm's coupled-type, pedestal-bearing synchronous motors applicable for direct-coupled drives such as in ore or rock grinding mills in mining and cement plants, roughing stands in metal processing plants, Banbury mixers, plasticators, and line shafts in rubber mills, etc. Allis-Chalmers Mfg. Co.

Liquid Level Gages

8-p. bulletin discussing the operation and design of various models of remote reading liquid level gages used with boilers, deaerating tanks, boiler feed water heaters, storage tanks or any installation where constant observation of liquid level is an important factor. Jerguson Gage & Valve Co.

Filtration Equipment

4-p. bulletin discussing the construction, application and sizes of three types of continuous vacuum filters—the drum, disc and top-feed types. The Eimco Corp.

Tractor-Shovels

Catalog covering specifications and design details of tractor-shovels along with action views of the machine operating in the construction and public works fields in addition to industry. The Frank G. Hough Co.

Mills and Mixers

8-p. bulletin giving data on construction details, operation, shipping weights and dimensions, and operation of 1 point and 4 point control roller mills, colloid mills and angular mixers. Troy Engine & Machine Co.

Oxygen Combustion Bombs

8-p. bulletin featuring oxygen combustion bombs used in micro analyses, testing explosives and high precision calorimetry. Farr Instrument Co.

ADVERTISER'S INDEX

ALLIED ASPHALT & MINERAL CORP. B18
Agency—Doyle, Kitchen & McCormick, Inc.
AMERICAN-BRITISH CHEMICAL SUPPLIES INC. 6
Agency—Richard Lewis, Advertising
AMERICAN MINERAL SPIRITS CO. T18
Agency—Leo Burnett Co., Inc.
ANTARA, PRODUCTS DIVISION OF GENERAL DYESTUFF CORP. 27
Agency—J. Hayden Twiss, Advertising
ARNOLD, HOFFMAN & CO., INC. 20
Agency—George T. Metcalf Co.
ATLAS POWDER CO. 19
Agency—The Aitken-Kynett Co.
BAKER CHEMICAL CO., J. T. 22
Agency—Wildrick & Miller, Inc.
BROWN CO. T28
Agency—J. M. Mathes, Inc.
CARBIDE & CARBON CHEMICALS CO., A DIVISION OF UNION CARBIDE & CARBON CORP. 47
Agency—J. M. Mathes, Inc.
COMMERCIAL SOLVENTS CORP. 12
Agency—Fuller & Smith & Ross, Inc.
COWLES CHEMICAL CO. B28
Agency—The Bayless-Kerr Co.
DAVIS CHEMICAL CORP., THE . . . . . 3rd Cover
Agency—St. Georges & Keyes, Inc.
DEMPSTER BROTHERS, INC. 35
Agency—Charles S. Kane Co.
DOW CHEMICAL CO., THE 10-11
Agency—MacManus, John & Adams, Inc.
EASTMAN KODAK CO. 32
Agency—Charles L. Rumrill & Co., Inc.
EDWAL LABORATORIES, INC. 23
Agency—Hamilton Advertising Agency, Inc.
ESSO STANDARD OIL CO. 44
Agency—McCann-Erickson, Inc.
GENERAL CHEMICAL DIVISION, ALLIED CHEMICAL & DYE CORP. . . . . Back Cover
HALL CO., THE C. P. 2
Agency—Cruttenden & Eger Advertising
HOOKER ELECTROCHEMICAL CO. 41
Agency—Charles L. Rumrill & Co., Inc.
KAY-FRIES CHEMICALS, INC. 6
Agency—Richard Lewis, Advertising
KOPPERS CO. 42
Agency—Batten, Barton, Durstine & Osborn, Inc.
NAUGATUCK CHEMICAL DIVISION, UNITED STATES RUBBER CO. 21
Agency—Fletcher D. Richards, Inc.
NEVILLE CO., THE B30
Agency—Advertising Agency of William Cohen
OIL & CHEMICAL PRODUCTS, INC. T30
Agency—Byrde, Richard & Pound
OLIVER UNITED FILTERS, INC. 3
Agency—Sanger-Funnell, Inc.
PACIFIC COAST BORAX CO. T36
PFIZER & CO., INC., CHARLES 49
Agency—Doyle, Kitchen & McCormick, Inc.
PHILIPP BROTHERS CHEMICALS, INC. 4
Agency—Arlington Advertising Agency
PITTSBURGH COKE & CHEMICAL CO. 31
Agency—Walker & Downing, Advertising
PRESSED STEEL TANK CO. 43
Agency—The Buchen Co.
QUAKER OATS CO., THE 1
Agency—Rogers & Smith, Advertising
SHARPLES CHEMICALS, INC. 9
Agency—Sommers-Davis, Inc.
SINDAR CORP. B26
Agency—Hazard Advertising Co.
SOLVAY SALES DIVISION, ALLIED CHEMICAL & DYE CORP. . . . . 2nd Cover
Agency—Atherton & Currier, Inc.
TENNESSEE CORP. 25
Agency—Crawford & Porter, Inc.
TEXAS GULF SULPHUR CO., INC. 38
Agency—Sanger-Funnell, Inc.
ULTRA CHEMICAL WORKS, INC. 29
Agency—S. R. Leon Co., Inc.
UNION CARBIDE & CARBON CORP., CARBIDE & CARBON CHEMICALS CO. 47
Agency—J. M. Mathes, Inc.
UNITED STATES POTASH CO., INC. B36
Agency—McCann-Erickson, Inc.
VICTOR CHEMICAL WORKS 24
Agency—Cruttenden & Eger Advertising
WARWICK WAX CO., INC. 5
Agency—Ben Sackheim, Inc.
WELCH, HOLME & CLARK CO., INC. T26
Agency—Byrde, Richard & Pound
WYANDOTTE CHEMICALS CORP. 37
Agency—N. W. Ayer & Son, Inc.

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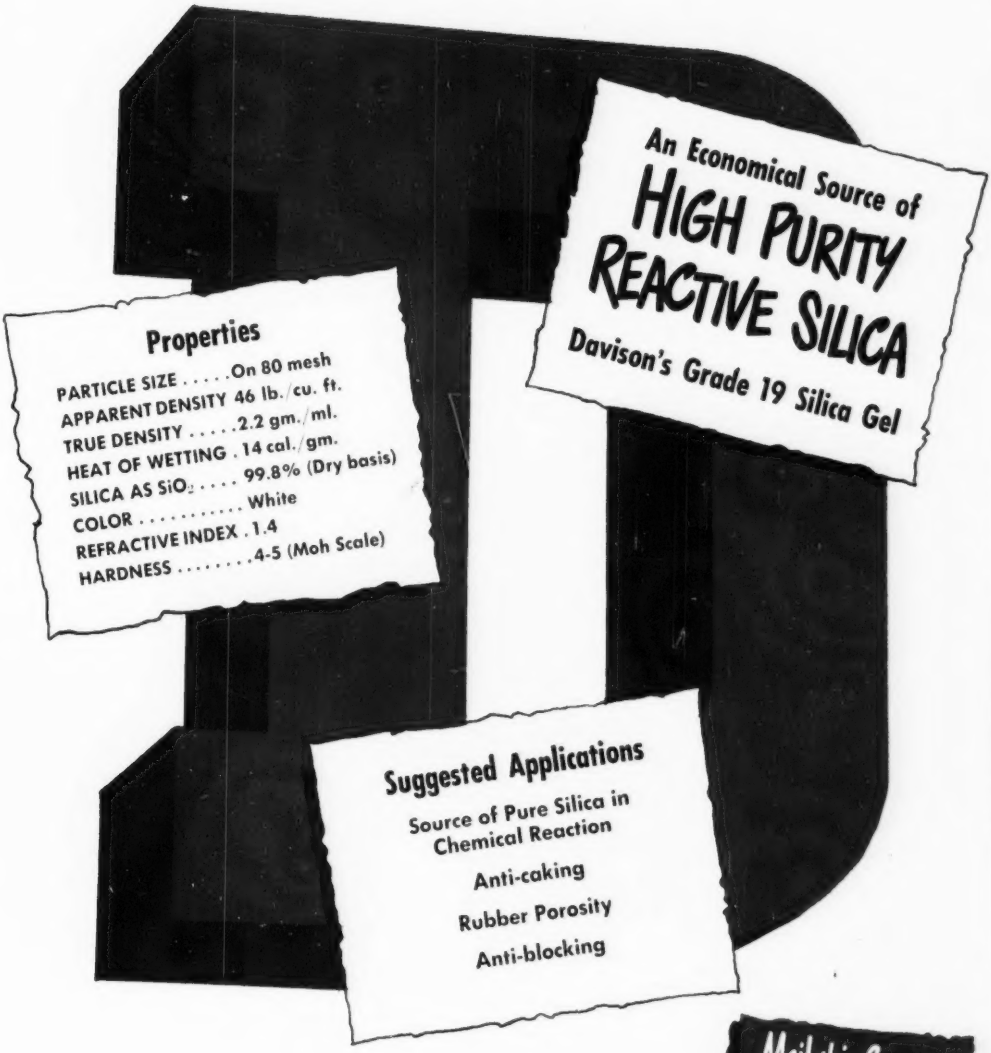
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